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PLUMBER & STEAM FITTER of CANADA

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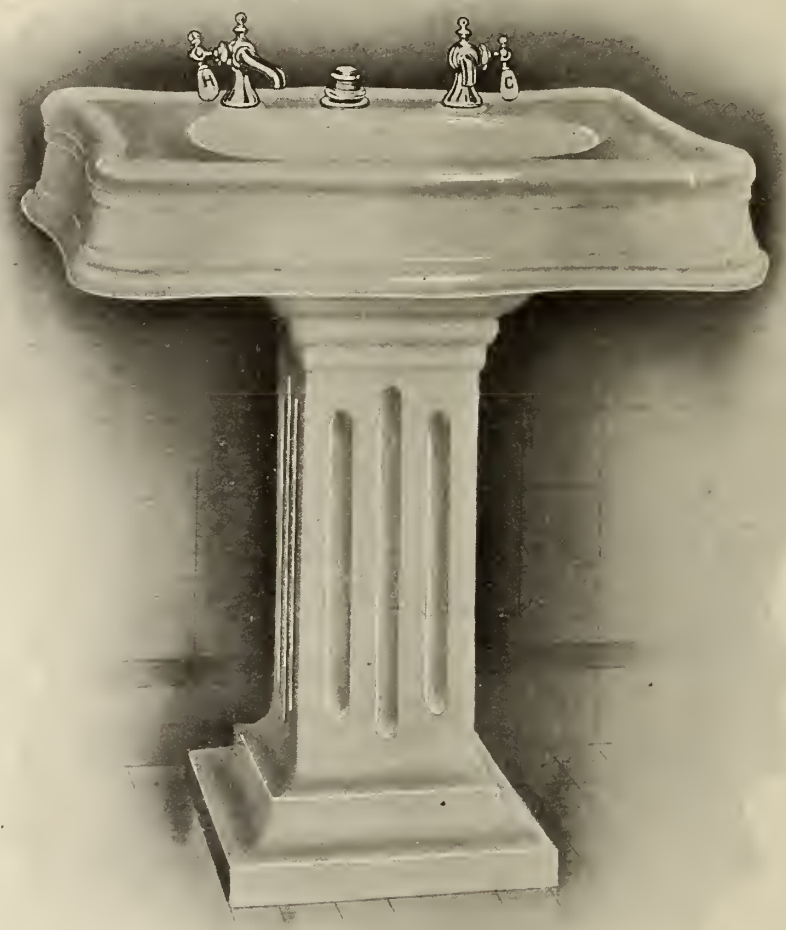
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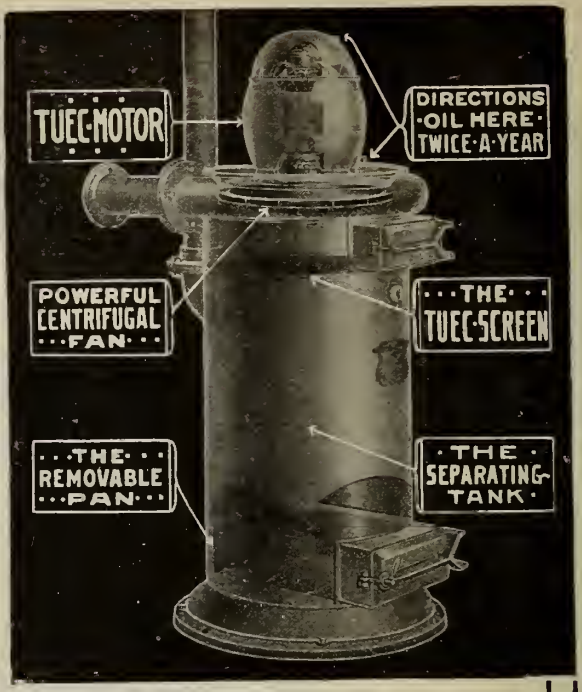
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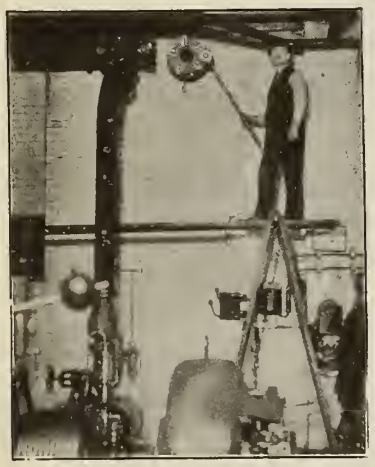
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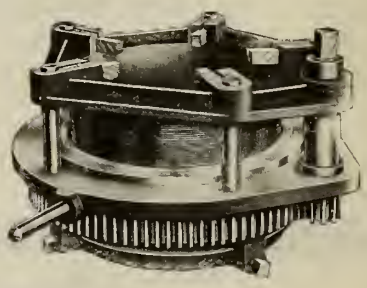
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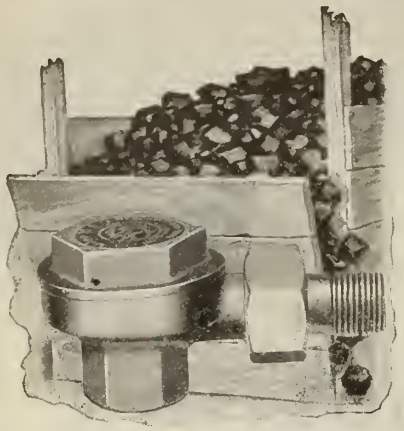
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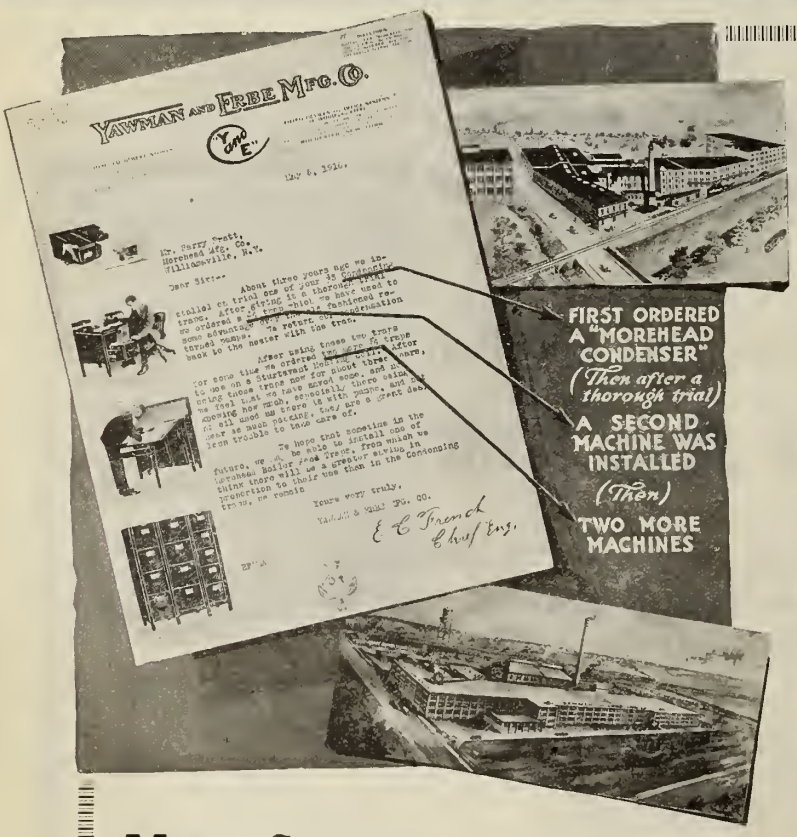
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SANITARY ENGINEER

PLUMBER AND STEAMFITTER OF CANADA

Official Organ of the Sanitary and Heating Trade

Vol. XI. TORONTO, JANUARY 1, 1917 No. 1

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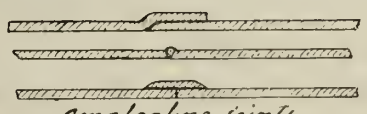
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Ask the Valuator of a Loan Company, and he will tell you that in valuing a house for loan purposes, special attention is always paid to the Sanitary arrangements and that a nice bath-room with snowy white enamelware, frequently determines the amount of the loan.

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There are several thousand houses which could be made more valuable out of all proportion to the cost, by the installation of a new bath-room and other Plumbing arrangements. We believe the owners would be ready to spend the money on this equipment, if they only knew how easy it is to get it and how reasonable would be the cost.

The Manufacturer is quite willing to do his share to get this business, but the Plumber is the real salesman. He knows the people in the different localities; they have confidence in him and it is only necessary for him to present the advantages of having a good bath-room in order to make and get new and productive business, and he will find PORT HOPE ENAMELED WARE an extra inducement, on account of its good design, fine finish and lasting quality.

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THE SANITARY ENGINEER

VOL. XI JANUARY 1, 1917 No. 1

The Cost of Doing Business

Cost is Something Absolute, it Must be Paid in Some Form or Other and by Some One —The Person Starting in Business Should Never Lose Sight of the Cost of Doing Business, if He Wishes to Succeed.

BY ONE OF US.

Article III.

SOME of those of our readers who are interested in this series of articles have expressed the opinion that "One of Us" is letting down too lightly the "one man business," when such things as light, heat, insurance collections, association dues, lost labor, etc., are being left out of the items to be charged under overhead expenditure. And to some extent they are right, but we must bear in mind that most men the first year in business endeavor to conduct their business on a very small margin; furthermore, we are making certain provisions for many small incidental items by charging up all the time which is being devoted to the business.

Continuing, however, let us refer to the figures mentioned in our last issue. Two thousand seven hundred hours were charged up at 80 cents per hour, and the sum of $2,160 credited to account of time. Then, 1,315 hours at 50c per hour was also charged, but no cost received, therefore no credit could be given, except that the profit from time appears to liquidate this charge, and for the present we will assume such to be the case and that there is no charge for lost time to be made from the 2,700 hours.

Now, the next matter to deal with is merchandise and sale of the same; it might be a question as to the advisability of separating the two items, time and material; but we are doing this because many try to justify this method by adopting a charge of so much per cent. profit (?) on time and so much on material. We are not endorsing any method as yet, but rather pointing out a few conditions and facts that enter into a "one man business."

Speaking to one man some time ago, he recalled figures for material that he used the first year, which work considered chiefly of jobbing and the work in eight new houses. Only a matter of $4,000 worth of material was charged up to the work, with a loss of material amounting in value to a little over $40, call it one per cent.

The profit (?) he charged on material was 15 per cent., on invoice cost, and of course he made money; at least he assured the writer that he had; therefore, we will assume that $4,000 of material and 2,700 hours at 50 cents per hour is to be the basis of all profits.

These two items, per invoice and time book, total $5,350, but as there are two different increases in value per cent. made, we must for the time being keep them separate, and as there has been a charge of 15 per cent. for what is for the present to be called profit, $4,000 is really only 85 per cent. of the whole, plus 15 per cent., making a total of 100 per cent. Therefore, the selling price of these goods would amount to, in round figures, $4,705.90.

It may be asked how these figures were arrived at. Here is the method followed: If $4,000 plus 15 per cent. profit is the selling price value of the goods, then $4,000 and 15 per cent. equals 100 per cent. Such being the case, $4,000 is really 85 per cent. of the whole; therefore, one per cent. of the whole would be arrived at by dividing $4,000 by 85, or $47.06—this sum being 1 per cent., 100 per cent. will come to $4,705.90, in round figures.

We will now analyze the figures charged for labor in the same manner. 80 cents is the total 100 per cent. selling price of labor and the total proceeds from 2,700 hours amounted to $2,160, and the price paid per hour was 50 cents, according to wages account. Now, if 80 cents per hour is the total selling price for one hour, $1.60 will be the price for two hours, which means that there is an increase of 60 cents added to every dollar, viz., 60 per cent. profit on labor.

Now, there are quite a number of men who will lead themselves into the idea that they would be making the following per cent. of profits: 15 per cent. on material, and 60 per cent. on labor, and they will say, "dollar for dollar I am making 15 cents on material and 60 cents on labor."

But another question is to be considered, that of overhead expenses, and we have taken for granted that any money paid out or time expended in the business must be paid for in some way or other. The total revenue is as follows:

TABLE II.

Total Material	Expenditure $4,000.00	Total Material	Receipts $4,705.90
Wages	1,350.00	Labor	2,160.00
O.H.X.	818.50		
Total	$6,168.50	Total	$6,865.90
		Expenditure	6,168.50
		Balance on hand	$ 697.40

The above table shows a surplus of $697.40. How much per cent. will this business make, and how would a person require to govern properly the selling price of labor and material on an equal percentage basis?

The total selling price of material and labor netted the sum of $6,865.90, and the surplus over invoice and time cost is $697.40, which amounts approximately to 16 1-6 per cent. gain, though at the same time we must not forget that had this same man worked for an employer he would have received $2,007.50 as a result of working 4,015 hours at 50 cents per hour. While on the other hand it was necessary for him to assume all manner of risks, collections, and the turning over of something near $7,000.

(To be continued.)



FIG. 1.—MAIN BUILDING OF THE UNIVERSITY OF TORONTO, NORTH OF AND FACING THE CAMPUS.

Central Heating and Power Plant, University of Toronto

By L. M. Arkley, M. Can. Soc. C.E. *

The operation of central heating plants for the supply and distribution of heat over comparatively large areas has been successfully accomplished in certain instances by progressive municipalities. The private installation of such systems, however, is somewhat infrequent, due probably to absence of opportunity. Such an enterprise as that featured in the present article possesses exceptional interest not only because of magnitude and distances involved, but because of the consistent results which are justifying the wisdom of the undertaking.

THE buildings which comprise the University of Toronto are situated in extensive grounds, on west side of Queen's Park, in the city of Toronto. Bounded on the north by Bloor street, the west by St. George street, and the south by College street, the 21 buildings, as shown in plan, Fig. 5, present a problem of considerable magnitude and interest as regards the provision of a suitable heating system.

Previous to the year 1911-12, the widely scattered buildings were heated by several separate plants, the most of which were old and inefficient. Electric current for light and power was partly generated in these plants and partly purchased from supply companies. Conditions, therefore, were such that the possible economies which could be effected through the installation of a central heating and power plant warranted such a procedure, and the gradual reduction of costs since the plant was put in operation is submitted as amply justifying the centralization arrangement as well as that of the equipment installed.

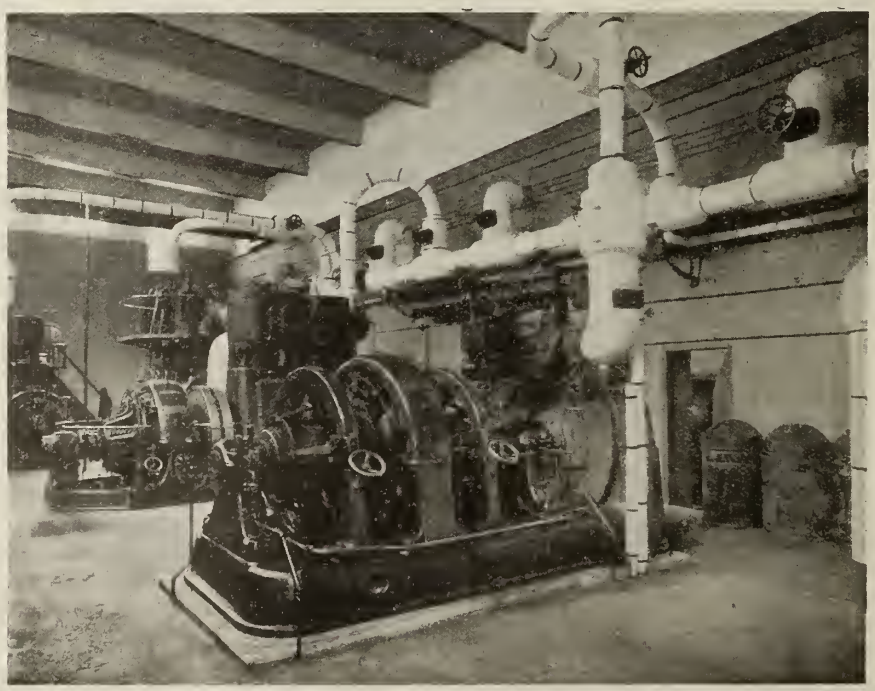


FIG. 2—INTERIOR OF POWER HOUSE ENGINE ROOM SHOWING CURTIS TURBO-GENERATOR IN FOREGROUND WITH ALLEN HIGH SPEED UNIT IN REAR

Power House

The location selected for the central plant was to the east of the Medical Building (4), and adjacent to the western end of the Ontario Legislative Building in Queen's Park. The power house building is for the most part underground, its flat roof being practically level with the pavement in the adjacent driveway in the park, from which the ground slopes down so that the west wall of the building is about eight or ten feet above ground level.

The main object in providing such a location was to facilitate the installa-

*Assistant Professor of Mechanical Engineering, University of Toronto.

tion of a gravity return heating system. An additional, though minor advantage, was that it has been possible, by placing ornamental balustrades on roof of the coal bunkers, and the judicious planting of shrubbery, to almost entirely disguise the location of the plant so that the scenic surroundings of the Legislative Building suffer no detraction whatever.



FIG. 3—KNOX COLLEGE. THIS EDIFICE ALSO FACES THE CAMPUS, AND IS ONE OF SEVERAL RECENTLY COMPLETED BUILDINGS

The ground space occupied by the building including the coal bunkers, is 82 feet in length by 107 feet in width. The sectional view, Fig. 7, shows the relative position of the engine room, boiler room and coal bunkers. The boiler room is 58 feet wide, with a total height of 26 feet and contains four Babcock and Wilcox water tube boilers, each of 403 nominal horse-power, and one boiler of the same make with a rating of 516 horse-power, giving a total of 2,128 boiler horse-power.

All of the boilers operate at a pressure of 150 lbs. per sq. in., without superheat, and each unit is equipped with a Murphy automatic smokeless furnace to which coal is fed by gravity from the overhead bunkers. These have a capacity of 600 tons, are built of concrete, and, as shown in Fig. 7, overlap the furnaces so that a suitable angle is obtained for the delivery pipes which are fitted with sluice valves at their upper end for regulating the supply of coal. The bunker is 25 ft. wide and 12 ft. high, and the roof forms part of the roadway by which the coal is brought to the plant, the sidewalk, along with the balustrades referred to, being indicated thereon.

An induced draft system is operated in conjunction with the boilers—two 78-in. American Blower Co. fans coupled to Robb fan engines drawing the waste gases from a smoke breeching extending along the back of the boilers (see Figs. 6, 8, and 10), and discharging them into an underground concrete tunnel leading to a brick stack which is built into a corner of the Medical Building (4).

Boiler feed requirements are taken

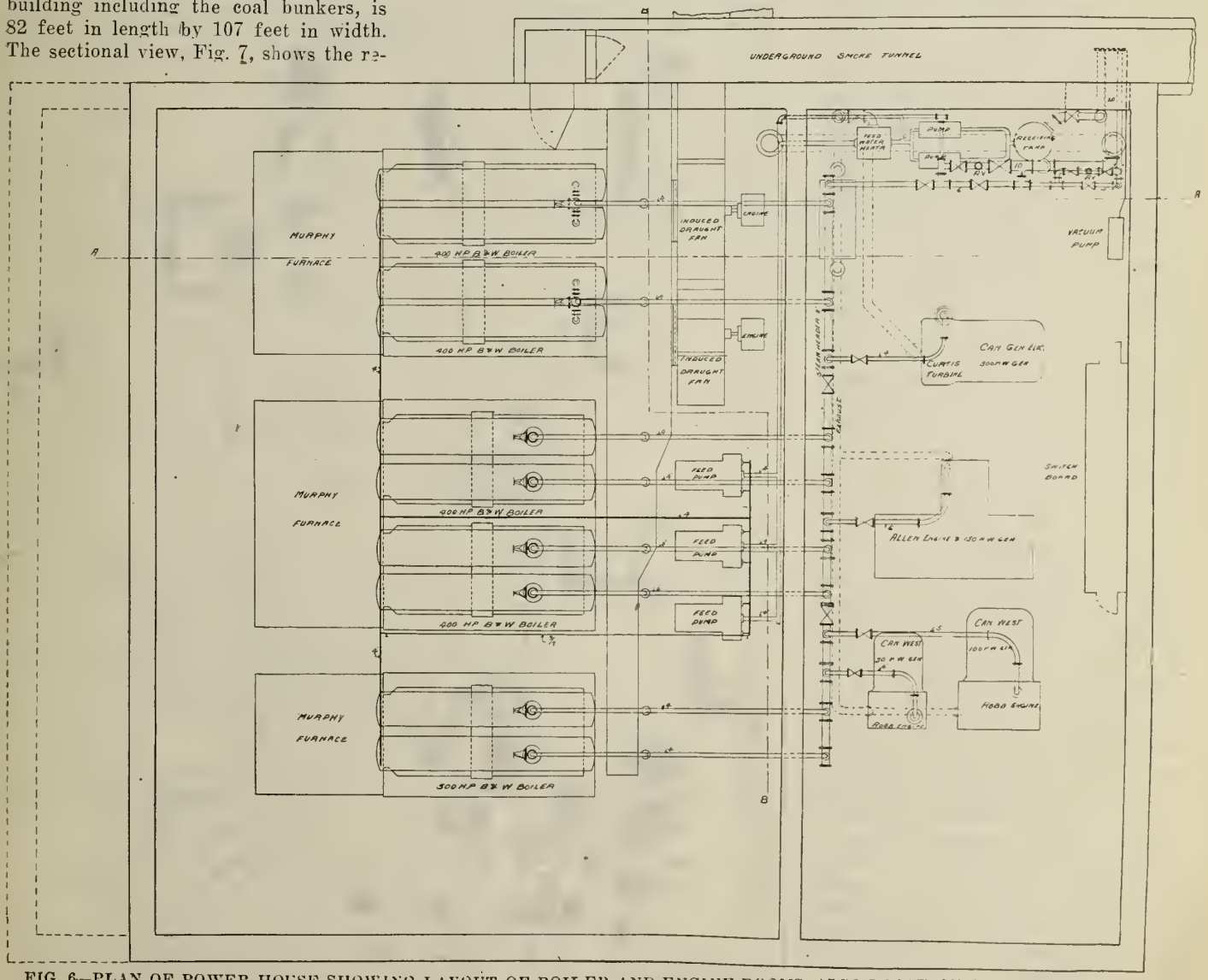


FIG. 6—PLAN OF POWER HOUSE SHOWING LAYOUT OF BOILER AND ENGINE ROOMS, ALSO LOCATION OF UNDERGROUND SMOKE TUNNEL



FIG. 4—DEPARTMENT OF HOUSEHOLD SCIENCE BUILDING, SITUATED ABOUT FIVE EIGHTHS OF A MILE FROM THE CENTRAL HEATING PLANT

care of by an installation of three Smart-Turner duplex steam-driven feed pumps. These are illustrated in Figs. 10 and 11, and are of the outside end-packed plunger type, 10 in. x 6 in. x 10 in., with pot valves. They are situated immediately behind the boilers, and are so piped that two independent methods are available for supplying water to the boilers. At the near end of the pump room, Fig. 10, is the sump, equipped with two small steam pumps for draining purposes, and one Bundy steam trap for taking care of the high pressure drips.

The coal used is a bituminous slack containing about 21 per cent. of volatile matter and this is burned with very little smoke. While the coal is not bought on the B. T. U. basis, samples are taken regularly from the delivery waggons and tested for ash, volatile matter, carbon, moisture and sulphur. This procedure has resulted in the quality of coal received being uniformly high.

Engine Room

The engine room extends the full length of the building, i.e., 82 ft., and is 30 ft. wide by 23 ft. high, the floor level being 3 ft. above that of the boiler room. It is separated from the boiler room by a 27-in. brick wall, and although not shown, a hand-operated overhead traveling crane is provided, fitted with a 3-ton Yale triplex block, which enables all maintenance adjustments and repairs to be conveniently made.

The equipment contained in the engine room consists of four steam-driven generating units, switchboard, water-weigher and feed water heater, with feed water and vacuum pumps, the purpose of the latter being explained under heating section.

The generators are all direct connected to their engines, and are as follows:

One horizontal Curtis steam turbine, driving a 300 kw. General Electric D. C. generator, running at 1,500 rev. per min. (see Fig. 2).

One high speed vertical compound reciprocating engine, with generator built by W. H. Allen, Son & Co., Bedford, Eng., cylinders 16 in. and 24 in. x 11 in. stroke, developing 300 kw. at 400 revs. per min. This unit can be seen behind the Curtis outfit in Fig. 2.

Two Robb, Armstrong-Westinghouse units of 100 kw. and 50 kw. capacity respectively—these engines are of the single cylinder vertical type, the former having a 15 in. x 14 in. cylinder, and speed of 275 revs. per min., and the latter a 12 in. x 10 in. cylinder, with a speed of 265 revs. per min., shown in Fig. 12.

All of the engines operate under a steam pressure of 140 lbs. per sq. in. at the throttle, while the generators supply direct current at a pressure of 110 volts, each unit having an individual panel on the switchboard, which has seven panels in all, two being for distribution purposes and the seventh coupled up to one of the local supply companies.

(Continued in next issue.)

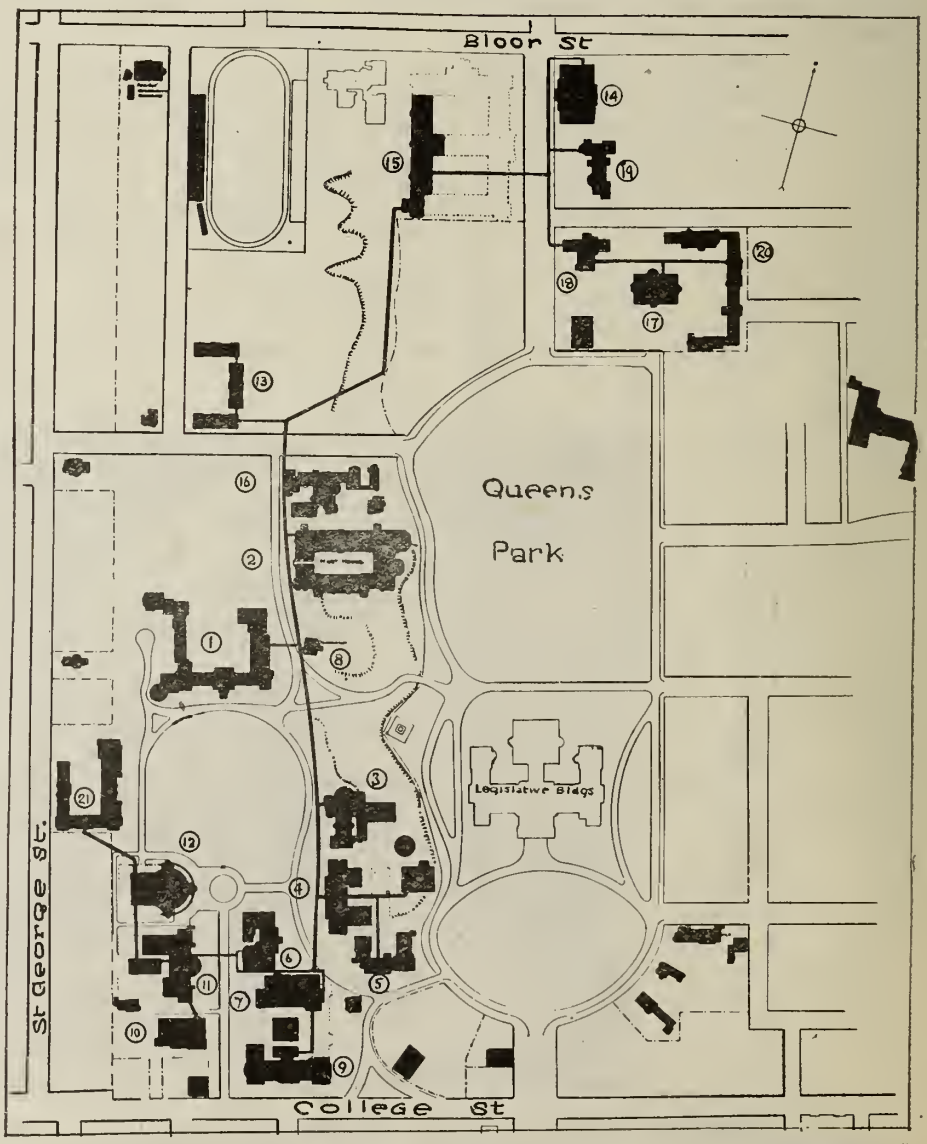


FIG. 5—GROUND PLAN SHOWING LOCATION OF VARIOUS BUILDINGS SERVED BY CENTRAL PLANT

The Importance of Pure Water

Pure Water an Inestimable Asset—Every Person Should Regard Water as a Sacred Commodity, and Should Refrain From Polluting it in Every Way—Sanitary Engineers Can Assist in no Small Way.

WITH the sanitary and heating engineering trade becoming more and more interested in the installation of sanitary plumbing and other fixtures in farm and rural homes, it becomes necessary for every member to be assured that the discharge from those fixtures shall be disposed of so that neither land or water be contaminated.

And to be doubly assured, every person installing such fixtures should become versed in the art of sewage disposal in all its details.

The series of articles entitled, Rural Sanitation, which is being published in THE SANITARY ENGINEER, should prove of great value to every reader, particularly so when we find how very important pure water is to humanity.

A few newspaper clippings are being reprinted, which contain some very interesting reading and which will show that the public are being taught more and more every day, to take no chances with questionable systems, cesspools, and the like.

The following is reprinted from *"Conservation,"* which particularly applies to one fatal disease that is brought about by either land or water pollution:—

HIGH COST OF IMPURE WATER

Its Toll in Disease and Death Represents an Enormous Sum

A recent report by George A. Johnson, water supply expert, exposes some very interesting facts respecting water filtration. The great benefits and, in many cases, the urgent necessity of filtering the water supplied to communities is clearly recognized, but its vital importance can only be realized by a thorough investigation, supported by the convincing data contained in this paper.

The figures given are for the United States, but with due regard to proportion, apply with equal force to Canada.

Mr. Johnson states that if the urban population of the United States were supplied with filtered or equally pure water 3,000 lives would be saved annually and 45,000 cases of typhoid fever prevented, representing in vital capital some $22,500,000 annually, or the interest on an investment of $375,000,000. In the United States an urban population of 30,000,000 persons is still supplied with unfiltered water; the cost of supplying filtered water to these, including fixed charges and operation of plants, would not be more than $12,000,000 per year, or about one-half the present annual loss in vital capital due to non-filtration.

Twenty-million people are now being supplied with filtered water at a cost not exceeding $8,000,000 or 40 cents per capita per year, and the results of water purification always show a big balance on the right side of the ledger.

In the United States, 300,000 persons suffer annually from typhoid fever and 20,000 die of it. Valuing the human lives lost at $3,600 each, and, allowing for lost wages and medical attention $200 for each case of the disease, the annual toll from typhoid alone amounts to $130,000,000.

It can plainly be seen that of all diseases, typhoid is one which can be stamped out by being clean, by disposing of sewage in a proper manner. The question is, "What is a proper manner?"

We sanitary engineers should know, if we do not, and we should see to it that when a house in the country is being equipped with plumbing fixtures, that the sewage is discharged into a septic tank; that sufficient field tile is used, not too much nor too little, but rather a safe average.

The articles we are publishing on Rural Sanitation, give all the particulars required, and the editor of THE SANITARY ENGINEER will also be only too pleased to do all in his power to help out anyone confronted with a sewage problem.

From now on it should never be said that any member of the craft acts in ignorance regarding any such problem. We should be leaders, and we can without a doubt. Our previous experience is surely enough to make us feel that sewage cannot be either simply discharged into a river, lake or stream, or even emptied into a cesspool. The simple fact of their having been cesspools which appear to have served their purpose, does not prove anything except that there never was and never can be a sanitary cesspool, because the very name self-condemns such a contraption as being extremely insanitary.

Here is an opportunity for each and every sanitary engineer to rise to the occasion, when newspapers all over the country are crying out against the pollution of streams, the waters from which are bound to find their way to wells and other water supplies.

The following is an article which recently appeared in the Ottawa *Journal*, regarding purification of water which should never need purifying, and if some fool schemers "professors" not possessors of knowledge, have their own way, the citizens of Ottawa are going to be fleeced out of eight to ten million dollars, owing to the pollution of the beautiful, pure water of the Ottawa river—water which the Great Creator placed right at the city's door, and even went so far as to furnish a natural deep reservoir in the form of Lake Deschenes.

WATER PURIFICATION.

Chapman & Hall, London, England, have recently issued a work on water purification and supply which bids fair to supersede what has been written on the subject up to date.

M. F. Stein, its author, presents the methods employed both in England and the United States—methods quite different in the two countries—depending partly upon the nature of the country, the peoples and the temperament of the latter. In England the writer states, "slow sand filtration" suffices, when it is preceded by more or less lengthy storage. In the United States, on the other hand, rapid mechanical filtration methods obtain, after adding chemicals for coagulating, sterilizing, or softening purposes.

In England many of the large cities and towns obtain their supplies of water from upland gathering grounds where the water is impounded in large lakes or reservoirs away from any chance of serious pollution.

In the United States, on the contrary, waters from rivers and streams that are polluted by town sewage and factory refuse, are treated chemically and the people generally do not object to this treatment as would be the case in England if such methods were attempted there.

Regarding Ottawa's water supply, if we propose to stick to the river water, legislation is absolutely needed, and at once, to prevent pollution of streams, at any point, followed by the simple slow sand filtration process of the waters that are held in the proximate sedimentation basis of Lake Deschenes.

There would certainly need be no necessity of treating our waters chemically to the extent that they have been, in recent years, if there was legislation to restrain towns, villages, and cities (Ottawa included—we may as well acknowledge it and act upon it) from dumping their precious pollutions in the heaven-given waters of our native streams.

No man, no community of men, have any right to pour virulent germs and poisonous fevers into waters which are for the beverage of man.

The commandment "thou shalt not kill" ought to apply in this case as it does in other murderous acts.

As to the practical value of town and city refuse—namely, in the chemical constituents—every one knows the enormous waste of moneys in the antiquated and almost obsolete (in a civilized country) method of dumping sewage into a river valley. Values can be recovered before dumping is done, of an astonishing nature.

In the neighborhood of Ottawa's river there are hundreds of houses with leaking sewers and drains which discharge into the river. Cesspools and all manner of filthy outlets pollute the river. With reference to the *Journal's* remark that, "If there was legislation to restrain towns, villages and cities (Ottawa included), from dumping their precious pollution into the Heaven-given waters of our native streams, there would be no need to treat the water chemically, etc.," we would point out that there is a law in Ontario which can restrain, etc., but which does not. Our Provincial Health Departments cannot enforce the laws which are already in existence.

As we have said, there is such a law, and part of it appears on another page. But what about the natural laws?

Do we in this day of civilization need laws to enforce Nature's command, "Be thou clean"? We can not dull that voice, nor can we declare we are not our brother's keeper. Ottawa would be banned as unfit for habitation if the letter of the law were enforced. But she and

(Continued on page 16.)

THE SANITARY ENGINEER

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REDEEM THE PAST

IT is better by far to make new resolutions and try to keep them than never to make them or never to even try to improve one's self. But one thing which our craft should do, and do every day, is to try and redeem the times. Make the public take more interest in us than they hitherto have done. Show them in an earnest manner that we are out to please; be more diplomatic, and when a complaint is made, try to believe for the moment that the customer is right.

It's hard, we know, the writer knows only too well, but what have we gained by either being indifferent or resenting the aspersions that have been heaped upon the craft. In many cases we have deserved it, but very often a soft answer, a little persuasion and explanation would have put the contentious matters right. Just recently the writer was a silent listener to an argument. Here is what transpired:

About 4.30 p.m. 'phone bell rings, Mrs. Jones speaking.

"Are you Mr. ———, the sanitary and heating engineer?"

"Yes."

"Well, can you send a man up to my place right away?"

"What seems to be the trouble, Mrs. Jones?"

"One of the hot water pipes at the back of the stove is leaking and flooding the kitchen floor, besides putting the fire out in the range."

A man was sent up, expected to find the range connection leaking, only to find that an old 1-inch pipe coil in connection with the heating system was leaking. Nothing whatever to do with the range connection, but true, as Mrs. Jones had said, a stream of hot water was flowing on to the top of the range and putting out the fire.

Here was a chance for some explanation, but instead, the man went about his work, drained the whole heating system, plugged the outlets, filled up the system again and had the leaking coil sent to the shop.

A good half day's work, but Mrs. Jones was no wiser, could not understand why so much work was needed, and was therefore at a loss to know why so much time was involved; came to see Mr. Sanitary Engineer about the account after it had been owing for several months.

So let us bear in mind that if there is any doubt about the magnitude of the work, or if a little explanation before a job is started can be given, many of the hard feelings against the craft will be forgotten. The time spent in explaining details is always willingly paid for by at least 90 per cent. of the persons who require the explanation.

NEW SERIES ON SANITARY SCIENCE

IN most large cities there are now being conducted technical classes for sanitary engineers, and we understand some are merely classes in which the art of construction will be taught. This is all very well so far as it goes, but there is still a little more than construction practice required. Further, in many of these classes there will be taught formulas and technical terms which, unless the student has received almost a college education he will be at a loss to understand. With these points in view, this new series of articles is being published. The first appears in this issue and takes the form of an introduction. Article II will be illustrated, showing several experiments that can be indulged in by the student. It will be the first series of its kind to be published in THE SANITARY ENGINEER.

Any readers who do not quite understand any points taken up are quite at liberty to write in and ask for further explanations which will be answered not later than one month after the question is received. All inquiries should be accompanied with the enquirer's name and address, which will not necessarily be for publication.

SPLENDID PUBLICITY

NEVER in the history of the world has so much publicity been given to matters on sanitation. It is almost an impossibility to pick up a newspaper that does not contain some item in this connection, and no craftsman is so vitally interested, both from a business standpoint as well as physical and mental viewpoint as is the sanitary and heating engineer.

Now, how are we going to respond to this live topic, this splendid publicity? Are we going to let the public merely read, mark and not learn how sanitary measures can be put into practice, how homes can be made real sanitary homes? We should grasp this opportunity, figuratively speaking, "With both hands." We should let the public see that we can do more for them than all or any other craftsmen, that our work is not only to stamp out filth and disease, but to prevent it ever existing. We can do it. The work of the sanitary and heating engineer, and his work only, can do this, can make life worth living, and make this old world better to live in.

It was such conditions as exist in and around our farms and country homes, ay, and even in many of our city homes that brought on the great plague in

Old London, and nothing but sanitary measures, sanitary plumbing, better ventilation and purer water supplies, cleaned up and stamped out the fell plague.

Therefore, considering the fact that most people are in a receptive mood and are giving much thought to sanitary plumbing, pure water supplies, sanitation on the farm, it behooves every member of the craft to respond, to put forth his best efforts to satisfy the wants of the people, that without doubt are real requirements, not only from a monetary viewpoint, but also from the standpoint of cleanliness, which is next to Godliness.

TRUE CO-PARTNERSHIP

IF every fellow starting in business on his own account would take a little different view of the step he is about to take, and, instead of aiming to procure a goodly number of customers, he would look upon every customer or prospective customer as a partner, he would no doubt get the right perspective of true business. Somehow or other there seems to be a feeling in almost every business man that those to whom he sells are merely so much "physical anatomy" from which to make profit.

Now, what would be the result if instead of such a view, one were to keep in one's mind that every customer will be a partner, and that the business man is out to procure partners on a mutual and profitable basis. No one would ever dream of taking in a losing partner or one who would prove a loss to one's business. Would they? Very well then, why sell at a loss, why cut prices to the quick. Such conduct is from first to last ruinous.

On the other hand, would it be possible to procure a partner in a business if the business could not show a profit? Such a question is equal to that of a person getting a poor cut price job done, or rather only half done, there would be no profitable service in the job for the person having the work done.

These arguments prove clearly that when a person starts, or even when he is established in business, he should look upon every one of his customers as partners in his business. This can only be done by demanding a fair price for all work done and material supplied, as well as seeing to it that the work and material will give maximum service, thus proving to be a profitable investment.

SERVICE COUNTS

TAKE up any first-class book on any subject, whether it be on capital or labor, or whatever subject spiritual or temporal, the greatest and most important feature embodied in them all is service.

Service counts more than all. Wealth is subservient to service, which is invaluable. Ask a man in business what he values most, and he will reply loyal and faithful service. Ask a man about his machinery, and he will tell you that he values his machines according to the service he gets out of them. Ask him about the cost, and he will tell you it is not the cost, but the service value that counts.

Human service cannot be bought with wealth, no one can buy loyalty, because loyalty is not for sale, never. Loyalty is given by the spirit of service, and service is never really bought or paid for. Service is giving. Service is no part of bartering. Service is that which is given over and above that for which money is received. It is a something given without thought of gain, while wealth is merely that which enables the recipient to continue living that he or she may serve.

One man said to the writer a few days ago that the capitalist is the greatest servant, to humanity, because his wealth made it possible for the masses to labor and receive recompense for their labor.

Nothing of the kind. One might just as well declare that a north wind is more valuable than a west or an east wind, or that the night is more valuable than day.

The capitalist is nothing more than a manipulator, he produces nothing by himself. He would be a "non-existent" were it not for service, that portion of service which he receives but does not pay for, and were he to be as anxious for the well-being of labor as he is to amass capital, he would be ten times richer, in such riches as can not be bought with money. Those men who have given the greatest service to man are those who have lived an industrious life and died minus money. Therefore we should serve, serve in every way possible, serve and save of one's own substance and not save the substance to one's self that has been received from others. Service counts from the boy to the man, and the true wealth which never dies is that of service, both received and given, the rich man receives service in big amounts and gives away small amounts, thus amassing the results of unearned service in the shape of riches.

"Who serveth others serveth self
In way most wise and real;
For none can rise while others fall,
And truest gain is good for all,
And wealth the common weal."

EDITORIAL BRIEFS

WATCH your overhead and read the article on page 9.

* * *

CONDUCT your business or it will soon conduct you "to the bankruptcy court."

* * *

WATCH the market quotations and be satisfied to charge a fair price and no more.

* * *

READ the new series of articles in this issue entitled Practical Sanitary Engineering.

Practical Sanitary Engineering

The First Course of Its Kind Ever Published in Canada—Specially Prepared for the Craft Coming Up, as Well as Those Who in These Days Construct Work Simply Because the "By-law Says So"

BY THE EDITOR.

HOW many are there practising in the trade who, while first-class mechanics as far as real accomplishments go, do not know why they do work in a certain way?

They vent traps, they revent pipe lines, they construct work in many ways, and make very neat jobs; but they do not know, in hundreds of cases, why. How many men are there who know why some favor the use of a 3 in. in preference to a 4 in. soil pipe for a one bathroom and sink outfit, and vice versa?

Some craftsmen favor galvanized iron pipe in preference to lead for domestic water supply services throughout the house, others favor lead, but neither of these classes of men really know why. Just to illustrate one argument re this matter. Some persons assert that there is danger of lead poisoning, and will persist that certain water causes a white deposit to form on the walls of the pipe, and that this deposit is lead oxide. Just so. But the same argument can be used against the use of galvanized pipe, because of the fact that zinc oxide will form on the walls of galvanized pipe under certain conditions.

But neither of these arguments prove that either kinds of pipe are dangerous, the fact is that the metal is put, as it were, on the defensive, and oxidizes its own surface as a preventive against final destruction.

Once a coating of lead oxide has been set up, no further deterioration will take place and the chemical action of the water ceases, the same with the galvanized pipe. It all comes down to be one of cost in the first place. In New York and many other American cities, we are told that galvanized iron water pipes, as well as vents are being taken out because of corrosion. This condition, however, was not the cause of the deterioration on the inside walls of the pipe, but rather at the threaded joints, or portions exposed to the outside chemical action of the atmosphere. The course of instruction, of which this is the introductory article, will take up from the beginning a study in the laws of physics, hydraulics, and metallurgy, as well as biology, in so far as it concerns sewage disposal. All these sciences are of inestimable value in connection with ventilation, water and water supplies, hot and cold, circulation of water by gravity, house drainage and testing of drains, materials in use which could be easily applied to the science of sanitary engineering. There are also a number of materials hitherto never used in a general way by sanitary and heating engineers, which will undoubtedly come into use in the near future, and whose uses will be explained.

The manufacture of gas will be described, its use in industrial as well as domestic engineering explained, and reasons will be given why gas is of as great value at present for either heating, lighting, ventilating, refrigerating, as any other known element.

The question of humidity and its importance to those who study sanitary science, velocity of air, air pressure, and how we will define certain elements, will also receive attention.

It will not be out of place in these articles to explain why we in this craft took to ourselves the title of Sanitary Engineers, and at the same time, how in the Old Country members of the craft are known as plumbers, painters and decorators, or in some cases, plumbers and gasfitters.

In the old land, we were first known as plumbers, then as glaziers. Why? Simply because in the early days we had no such thing as putty, and windows were fitted into frames by "plumbers" —workers in lead. Painters and decorators next were affiliated with plumbers. The reason for this is said to be on account of carbonate of lead, or white lead being made by plumbers and then applied as coating, or paint. Thus we have plumbers, glaziers, painters and decorators. Then, as regards the title, gas fitters and the joint title, "plumbers and gasfitters," these designations came into being owing to the fact that many plumbers took to gas manufacturing in the old days. They made iron pipes, cast them themselves, installed these pipes in various ways, conveying the gases from the retorts to purifiers and meters. Then it became necessary to distribute the gas manufactured, and lead pipe being the pipe for all such purposes, both gas and water, the titles became joined, and plumbers were still workers in lead, but the lead pipe was given another use; therefore, we got "plumbers and gasfitters."

In this country there were still the plumbers, but very little window glazed in lead frames; then the climate made it necessary to adopt different methods of heating, and in those days water was not used to any great extent as a heating medium, except in greenhouses, while steam was more generally favored. The old-time plumber and gasfitter now became a plumber and steamfitter, and so on, until in Canada the craft have taken up the title of sanitary and heating engineers, and the day is not far distant when some of them will have to either drop the title "heating" engineers," or else add another responsibility to their title, that of ventilation, and will be known as sanitary, heating and ventilating engineers, or else simply sanitary engineers, and the heating trade will be known separately as "heating and ventilating engineers." With these convictions in mind, this course is being published, and will not, as we stated before, be so complicated or highly technical that the common school boy cannot grasp it. We know from experience that there are thousands of boys who will be training in the near future with a view of becoming efficient craftsmen and who cannot afford, or else cannot get to a school where the necessary practical theories can be learned, and who will be greatly benefited by reading this course.

(Continued in next issue.)

THE IMPORTANCE OF PURE WATER

(Continued from page 13.)

her people appear to be dead to the world as regards their sewage disposal system. Talk about farmers being a dirty lot, according to a statement made recently in a Toronto weekly, the whole of the city of Ottawa is doing exactly what many a farmer is doing, and no more—polluting a stream, the waters of which have to be consumed by towns and villages lower down the river.

Let sanitary engineers, therefore, be leaders in these matters. Let them refuse to instal plumbing fixtures unless the discharge therefrom be sanitarily disposed of, not merely buried in the ground to pollute both land and water.

BUILDING EXTENSIONS.

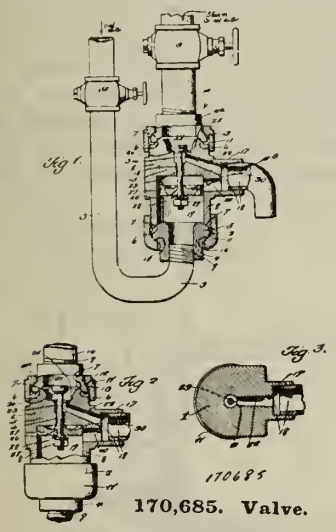
It is understood here that the Mueller Mfg. Co., Sarnia, propose making considerable extensions to their factory to take care of the increase in demand for their brass products.

New Canadian Patents

No. 170,685.

Edward F. Jones and Otto Christian Hanson, assignee of a half interest, both of St. Joseph, Missouri, U.S.A., 11th July, 1916; 6 years. Filed 13th January, 1916. Receipt No. 246,949.

Claim.—A valve comprising a casing having a partition wall and provided



170,685. Valve.

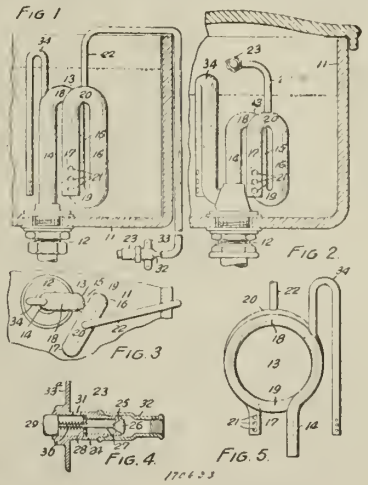
with a chamber above the wall in which the steam enters, and a chamber below the wall in which the cold water enters, said wall having a central bore being enlarged at one end, the enlargement terminating in a valve seat at its upper portion, said casing having an outlet passage adjacent to the wall and intermediate the chambers, a port of communication between the outlet passage and the enlargement of the bore below the valve seat, a port of communication between the passage and the lower chamber immediately adjoining the under surface of said wall, a plunger slightly smaller in diameter than the bore and guided therein and having a conical valve at its upper end co-operating with said valve seat to close the first port, a disc valve carried by the lower end of said plunger to control the second port, said disc valve being adjustable on the plunger and designed to contact with the under surface of said wall which constitutes an abutment when the disc valve is entirely raised to open the second port, a lock nut adjustable on the lower end of the plunger, a yieldable member between the nut and the disc valve, said disc valve having an annular depression on its upper surface forming a space between the partition wall and the disc valve to receive a portion of the steam pressure to cause the plunger to lower, which is also assisted in lowering by gravitation.

No. 170,633.

George Watson, Montreal, Quebec, Canada, 4th July, 1916; 6 years. Filed 7th July, 1916. Receipt No. 259,636.

Claim.—1. A flush tank siphon including two approximately inverted U-shaped members connected together at the bottom of one limb, the other limbs being of unequal length, means for holding and liberating locked or confined air in the siphon, an outlet larger than the siphon connected to the longer limb thereof, and an overflow pipe or tube of inverted U-shape connected with the outlet adjacent the limb of the siphon and adapted to have air sucked from it by siphonic action of the siphon on the operation thereof, whereby the overflow pipe will form an outlet and increase the volume of the discharge.

2. A flush tank siphon including two approximately inverted U-shaped members connected together at the bottom of one limb, the other limb of the U-shaped member being of unequal length, to form an inlet and discharge limb, a relief means connected with the top of the siphon at the inlet limb, an overflow tube connected with the upper portion of the siphon at the discharge limb, and



No. 170,633. Tank Flushing

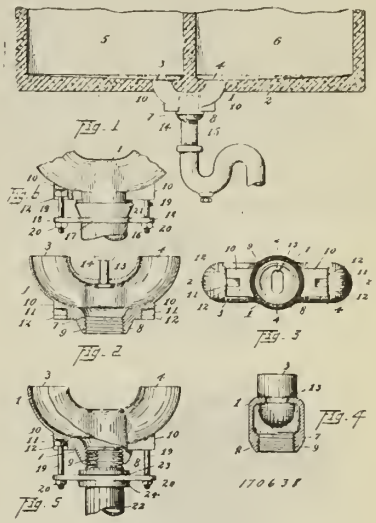
an outlet for both siphon and overflow larger than either.

No. 170,638.

Charles D. Wessels, Cleveland, Ohio, U.S.A., 4th July, 1916; 6 years. Filed 1st May, 1916. Receipt No. 264,926.

Claim.—1. A drain fitting comprising a member having branches for connection with the compartments of the receptacle to be drained, a stem for connection with a trap or waste pipe, open communication through the branches and the stem, the interior of the stem being threaded and the exterior of said stem being a truncated cone.

2. A drain fitting having branch connections with the compartments of the receptacle to be drained, a stem for con-



No. 170,638. Drain Mechanism.

nection with a trap or waste pipe, open communication through said branch connections and the stem, the interior of said stem being threaded and the exterior being of truncated cone formation, the said fitting having bolt hangers connected therewith.

3. A drain fitting comprising a casting having branches for connection with the compartments of the receptacle to be drained, bolt hangers on the under side of said branches, a stem for connection with a trap or waste pipe, open communication through the branches and stem, the interior of the stem being threaded and the exterior of said stem being of truncated cone formation.

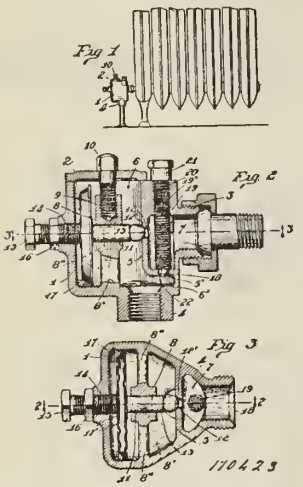
No. 170,423.

George B. Eddy, Chicago, Illinois, U.S.A., 27th June, 1916; 6 years. Filed 1st April, 1916. Receipt No. 263,719.

Claim.—1. In a valve of the character described, the combination with the outer valve casing, of an internal partition including an upright portion dividing the interior into two chambers, one constituting a combined inlet and sediment chamber, and the other a main chamber in communication with the outlet, said partition being provided with a valve

port in its upright portion, a thermostatic element and valve mechanism controlled thereby arranged wholly within said main chamber and operating to control said valve port, and a baffle in said inlet chamber extending opposite the valve port in said partition.

2. In combination, a valve casing having its interior divided by a partition into side-by-side inlet and main chamber, the lower end of said partition being deflected laterally to meet the side wall of the casing at a point above the bottom of the main chamber, whereby a portion of the inlet chamber is superposed above a portion of the main chamber, said partition being provided in its upright portion with a valve port and in its deflected lower portion with another port, a valve support extending into said main chamber, a valve plug slidably mounted in said support and arranged to co-operate with the port in the upright part of said partition, an adjustable stop screw threaded through the side wall of the casing op-



No. 170,423. Vent Valve for Heating Systems.

posite the end of the valve plug, said stop screw being capable of adjustment to directly engage the valve plug and hold it against its seat, and retractable to provide a substantial space between the end of the stop screw and end of the valve plug, an expansible thermostatic element loosely interposed between the stop screw and end of the valve plug, an expansible thermostatic element loosely interposed between the stop screw and valve plug, and a screw plug threaded to extend through the upper portion of the valve casing, its lower end entering and closing said port in the deflected part of said partition, whereby said screw plug may be retracted to open the port controlled thereby without opening the valve casing to the exterior.

3. In a valve, the combination of an internal partition provided with a port therethrough, of a screw plug threaded through the exterior of said valve casing and controlling said port, the part said valve casing through which the plug extends being relatively thick, the screw plug being of such length that when seated against the port its head end will terminate a substantial distance inside the outer surface of the valve casing, and a separate closure closing the outer end of the bore in which said screw plug is seated.

4. In a valve of the character described, the combination with the outer valve casing, of an internal partition dividing the interior into two chambers side-by-side one of said chambers constituting a combined inlet and sediment chamber, and the other a main chamber communicating with the outlet, said partition being provided with a valve port in its upright portion, and a by-pass port through the lower side of the sediment chamber, an automatic valve mechanism arranged in the main chamber to control the upper valve port, and a plug extending through the inlet and sediment chamber and normally closing the by-pass, said plug being arranged directly opposite but spaced away from the valve port and in the direct line of flow of the fluid on its way through the inlet chamber to said port, whereby said plug acts as a deflector to prevent sediment passing into said valve port.

No. 170,287.

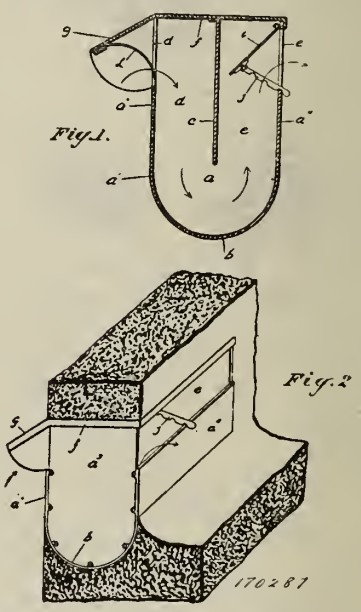
William George Beatty, Fergus, Ontario, Canada, 20th June, 1916; 6 years. Filed 12th February, 1916. Receipt No. 261,471.

Claim.—1. A ventilator comprising a casing having an inhaust orifice near the top of one side thereof and an exhaust orifice near the top of the opposite side, a baffle within the ventilator casing extending from the top thereof below the bottom of the inhaust and exhaust orifices, a damper to control the passage through the exhaust orifice, and means for holding the damper in its open or partly opened position, a passage for the air being provided between the bottom of the baffle and the bottom of the ventilator casing.

2. A ventilator comprising a casing having an inhaust orifice near the top of one side thereof and an exhaust orifice near the top of the opposite side, a baffle within the ventilator casing extending from the top thereof below the bottom of the inhaust and exhaust orifices, a damper to control the passage through the exhaust orifice, means for holding the damper in its open or partly opened position, a passage for the air being provided between the bottom of the baffle and the bottom of the ventilator casing, and an overhanging hood for the inhaust orifice, and a reticulated guard for the inhaust orifice secured to the overhanging hood and to the ventilator casing.

3. A ventilator comprising a casing formed with a rounded bottom, and having an inhaust orifice near the top of the side thereof and an exhaust orifice near the top of the opposite side, a baffle within the ventilator casing extending from the top thereof below the bottom of the inhaust and exhaust orifices, a damper to control the passage through the exhaust orifice, and means for holding the damper in its open or partly opened position, a passage for the air being provided between the bottom of the baffle and the bottom of the ventilator casing.

4. A ventilator comprising a casing formed with a rounded bottom, and having an inhaust orifice near the top of one side thereof and an exhaust orifice near the top of the opposite side, a baffle within the ventilator casing extending from the top thereof below the bottom of the inhaust and exhaust orifices, a damper to control the passage through the exhaust orifice, means for holding



No. 170,287. Ventilator.

the damper in its open or partly opened position, a passage for the air being provided between the bottom of the baffle and the bottom of the ventilator casing, and an overhanging hood for the inhaust orifice and a reticulated guard for the inhaust orifice secured to the overhanging hood and to the ventilator casing.

5. A ventilator comprising a casing having an inhaust orifice near the top of one side thereof and an exhaust orifice near the top of the opposite side, a baffle within the ventilator casing extending from the top thereof below the bottom of the inhaust and exhaust orifices, and a passage for the air being provided between the bottom of the baffle and the bottom of the ventilator casing.

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

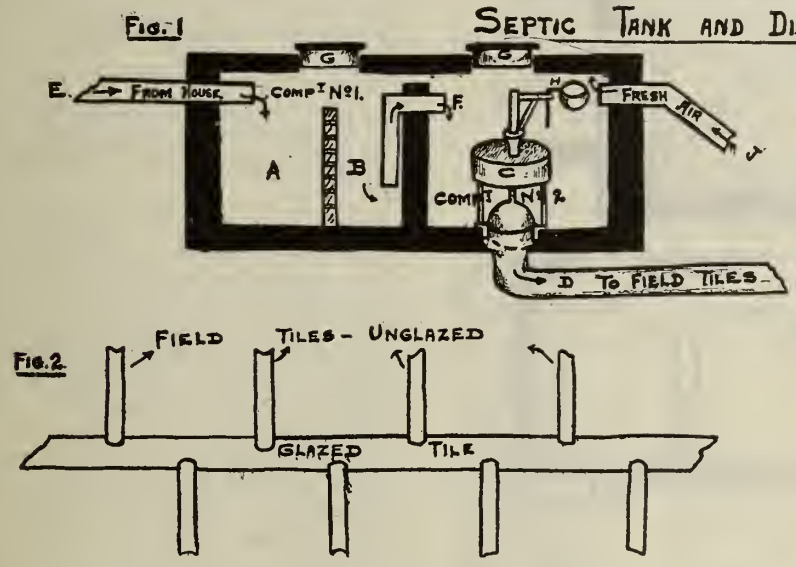
Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

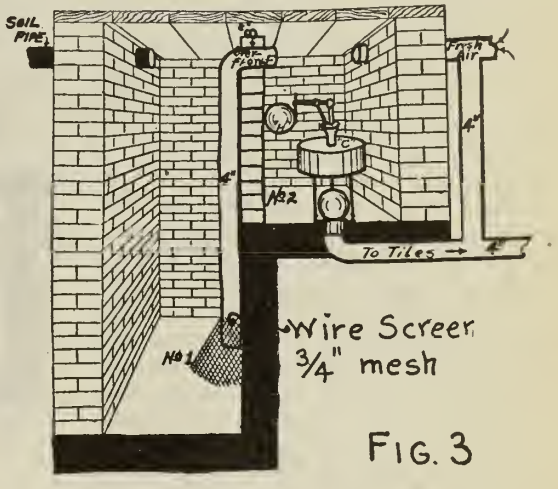
ARTICLE 16

IN tracing the history of the septic tank and of the sub-surface irrigation method for the disposal of domestic sewage, reference in previous articles has been made particularly to English invention and practice and to the somewhat later developments in the States. Canada was by no means entirely unrepresented in this connection as can be learned by reading the report of the Chemist of the Department of Agriculture for the year 1904. Dr. P. H. Bryce, now Chief Medical Health Officer of the Department of the Interior was, when the Secretary of the Board of Health of Ontario, instrumental in introducing the system to be described into various public institutions. In 1904 he authorized the statement that after fifteen years or since 1889 (a comparatively early date in the development of modern sewage disposal plants) this system had proven the most sanitary and most economical method yet discovered for sewage disposal on a moderate scale.

The chemist F. T. Shutt, M.A., F.I.C., F.C.S.; in this report of 1904 regards as one of the most hopeful signs of progress, even of advancement in civilization, the widespread desire in the country home for a better and more convenient water supply, for a bath-room, and for those sanitary conveniences (closet, sink, laundry, etc.), which go so far toward making the difference in comfort between the city and the farm home, especially in the winter. The requests for information regarding these matters, and particularly respecting some simple and effective method for the disposal of the sewage from the farm house he found—it is interesting to note—very numerous during this year (1904).

Prof. Shutt mentions the necessity of a water supply in the house or building for the working of the "Septic Tank System," and takes occasion to point out that the shallow well, sunk in the barnyard or about the farm buildings, ought in any event to be abandoned from a health standpoint.





The system illustrated in Figures 1 and 2 is described in the Report as follows:—

Figure 1 represents a tank fitted with the automatic discharge valve. The size of the tank for the ordinary farm house may be 6 feet long by 3 feet wide by 3 feet deep, or a working capacity, say, of 120 gallons to each compartment. Since it is apparently desirable that the sewage should be submitted to the action of the bacteria for a period of 24 to 36 hours before passing into the second compartment of the tank, it is perhaps better to have the tank a little too large than too small. It is customary to allow a capacity of 12 gallons for each person. It will be seen that by a partition wall, carried within two inches of the top or roof, the tank is divided into two smaller tanks or compartments figured as No. 1 and 2. Into the first of these, near the top, sewage from the house flows through the glazed tile E, connected with the soil pipe which opens above the roof. The pipe from closet, bath, sink, etc., should, of course, be trapped before entering the soil pipe.

In this tank or compartment, (No. 1) there should be a perforated partition, as shown in cut, to prevent paper and other solids entering the overflow and being carried over into compartment No. 2. It is in No. 1 compartment that the bacteria chiefly effect their work of decomposing the organic matter of the sewage, and when in time this compartment becomes full its fluid contents pass over into No. 2 by means of the overflow F.

If there is no perforated partition in No. 1 the lower orifice of this overflow F is covered with wire netting, which may act as a strainer to prevent any paper, etc., passing into No. 2. In compartment No. 2 is the automatic valve H, connected with the discharge pipe D, which carries the effluent to the subsurface tiles (see Fig. 2). The success of the system depends largely upon this valve, for it is essential that compartment No. 2 should be emptied as soon as it is full, and then allowed to refill. This can only be satisfactorily accomplished by a self-acting (both opening and closing) valve. This second chamber should have a 4-inch vent pipe to allow the en-

trance of air. Manholes are provided at G, to permit of the examination of the tank at any time. The probabilities are, however, that no cleaning out will be necessary for years, as the action of the bacteria is very thorough and complete in destroying organic matter.

The tank must be so situated that its glazed discharge pipe D at the point from which the field tile are led off is not more than 12 inches below the surface of the ground. This pipe, as well as the field tiles, are to be laid on a level so that the latter will be equally filled when the tank is discharged. If the ground be level, this will necessitate constructing the tank so that a portion of it is above the surface of the land, and in this case it should be banked around, covered with earth and sodded. It is not essential that the tank should be close to the house, but if placed at a distance the inlet pipe should have a fall from the house and be protected from the frost. Unglazed field tiles inserted every two or three feet along the discharge pipe D, finally distribute the effluent through the soil (Fig. 2). If desired, these distributing tiles from D need not commence in the immediate vicinity of the tank, but it is important that they should not be at a greater depth than 12 inches, unless the soil is very light and sandy and has good natural drainage. Since a 4-inch tile holds half a gallon, and it is essential that there should be tile capacity for all the effluent immediately on discharge, a tank with a compartment No. 2 of 100 gallons will require at least 200 distributing tiles. If the soil is heavy clay, it should be underdrained. When the soil is of such a character that percolation is difficult, the distributing tiles may be replaced by a "filter box" of sufficient size, filled with sand or gravel, or coke, the effluent entering near the top at one end and being conducted away from the other end by sub-drains. However, in practice it is found that a larger tank with less frequent discharge and more tiles is preferable to a filter box.

A feature of the plant just described is the means employed in an endeavor to prevent solids passing into compartment No. 2, or from the settling tank to the flush tank. In the well known paper on "A Simple Method of Disposing of House Sewage for Suburban Homes," by Mr. M. J. Quinn (another Canadian) there are shown two methods for replacing the perforated partition in compartment No. 1 or the settling tank. In one case the mouth of the overflow from the settling tank (within seven or eight inches of the bottom of the tank) is covered with a wire screen about the size of an ordinary pail, the mesh not exceeding three-quarters of an inch. The arrangement of the overflow screen shown in Fig. 4, it is claimed, has proven to be a very satisfactory one. It is merely three pieces of board which, with the cement partitions, make a box about ten or eleven inches each way in size; it is closely perforated with three-quarter-inch holes up to a height of about eighteen inches and is secured in place by a couple of pieces of wood reaching to the opposite side of the tank; it has the advantages of longer life than the wire screen and of being easily removed should occasion at any time require it.

The question of the advisability of screening, or even filtering sewage in its

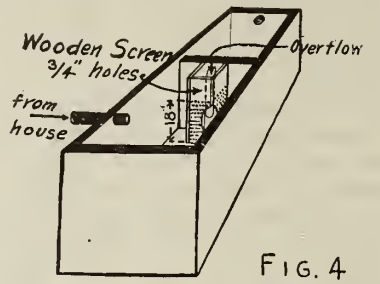


FIG. 4

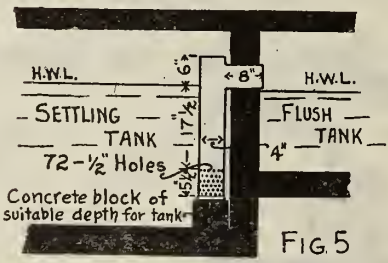


FIG. 5

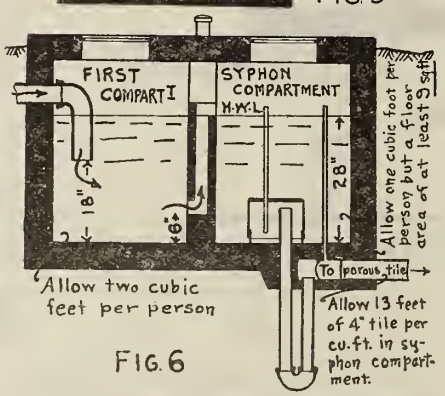


FIG. 6

passage from the settling tank to the flush tank will be the subject of a later article. But in this connection, if a screen is considered desirable, the writer has made a design for either a cast iron soil or vitrified clay overflow pipe. As to size, the ordinary 4-inch pipe could be used, but should be provided with six rows of holes, each row being composed of twelve ½-inch holes, near the bottom of the pipe, which could rest on a block of concrete (see Fig. 5). This overflow pipe could be made of a standard length, say 30 inches over all—with the top row of perforations 17½ inches below the surface of the liquid in the settling tank, bringing the bottom row of perforations about 23 inches below the surface. The block of concrete or other suitable material could be made of varying depth so as to rest on the bottom of any tank and yet close the otherwise open bottom of the overflow pipe.

By calculation it will be found that sixty-four ½-inch holes should permit of the same amount of sewage flowing through as the original 4-inch opening at the bottom of the pipe. Seventy-two ½-inch holes are provided which should result in no more cleaning being necessary than in the case of the wire or wooden screens, which though less expensive, are not permanent. When, or if, the settling tank should be cleaned, the concrete block could be removed to take out any deposits formed at the bottom of the overflow pipe.

By calculation it will be found that sixty-four ½-inch holes should permit of the same amount of sewage flowing through as the original 4-inch opening at the bottom of the pipe. Seventy-two ½-inch holes are provided which should result in no more cleaning being necessary than in the case of wire or wooden screens, which though less expensive are not permanent. When, or if, the settling tank should be cleaned the concrete block could be removed to take out any deposits formed at the bottom of the overflow pipe.

Being in the form of a "T," this overflow pipe provides for ventilation from flush to settling tank and no vents need to be placed or allowed in the partition wall.

Fig. 6, it is understood, represents a sewage disposal plant as now advised by Dr. P. H. Bryce, the syphon of his own design replacing the valve used in the earlier tanks. Also it will be noted that no attempt is now made to screen the sewage as it flows from the settling tank. Screening, the doctor apparently considers unnecessary, and there is no screen of any sort in his own residential sewage disposal plant, which, it is understood, causes no trouble whatever. Further treatment of this subject will follow in the next article.

H. L. Seymour.

NEW CATALOGUE

The Beaton Cadwell Mfg. Co., New Britain, Conn., have just issued a new catalogue describing their lines up-to-date. This concern is continually adding to its number of specialties, the latest being that of a new design of steel split floor plate, that can be used as both floor and ceiling plate. It is very similar to their No. 10A, but is fitted with a small set screw, so as to enable the plate to be more firmly fastened to the pipe, and is known as No. 10B.

This catalogue contains 100 pages fully illustrated, and can be procured from the factory or their Canadian agents. R. J. Devereux & Co., 233 St. James street, Montreal, or A. E. Hinde & Co., Chamber of Commerce, Winnipeg.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

The effects of peace discussions have been felt to some extent in the markets. Many large buyers are holding off while those who find it necessary to make purchases are extremely cautious. Prices generally are holding firm, and even though peace is in the offing, it is felt that high prices on most lines will prevail for some months to come. The old year, and a strenuous one it was, is drawing to a close, and thoughts are turned towards the New Year and what it will bring forth. Prices on many commodities are to-day at levels which a year ago would have been thought impossible. Despite high prices the year has been a most satisfactory one to manufacturers and the various trades. A number of important price changes are recorded in the market report which follows.

TORONTO, Dec. 30.—At the close of 1916 the trade looks back upon what has probably been the most remarkable year in the history of Canada. Thoughts are now turned towards the New Year. There is a feeling of uncertainty as to what the New Year will bring forth. There are many who believe that long before the close of 1917 peace will be declared. Some leading banking officials go so far as to predict that the war will be over within six months owing to Germany's inability to feed her people. It is, of course, impossible to tell what might happen. Canadians will hope for the best, and be prepared for the worst.

There is a general feeling that present high prices will continue for some time to come. Quite a number of important price changes have gone into effect since the last report. More, it is expected, will follow.

Stock-taking is now the order of the day. The usual holiday quietness prevails in trade circles, and during the past week most travellers have been in off the road.

Among many price changes are advances in globe, angel and check valves. Hot air furnaces have advanced 10 per cent. within the past two weeks.

Conductor pipe, eavetrough, galvanized sheets, pumps, flush valves, have also advanced.

Globe, Angle and Check Valves Are Up

VALVES.—There has been an advance of approximately 7½ per cent. in the price of the Jenkins globe, angle and check valves by the changing of the discount from 20 per cent. to 15 per cent on the standard grade. Gate valves have had the discount changed, and are now selling at 20 per cent. off list, as compared with 25 per cent. formerly. Iron body gate and globe valves are now quoted at 40 per cent. off list, as compared with 45 per cent. formerly. The Jenkins pattern of globe, angle and check valves are now quoted at 45 per cent., the former discount being 50 per cent. Ground work valves have changed from 50 per cent. off list to 45 per cent. off list. Steam cocks for standard are quoted at 53 per cent. off list, and high grade of the same are quoted at 50 per cent. off list.

Following are the discounts on various classes of work:

	Per Cent.
Ground work	45-47
Compression work, standard	55
High grade	48
Cushion work	40
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2, standard	49-53
High grade	40
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Steam cocks, standard	53
Steam cocks, high grade	50
Globe, angle and check valves, standard	25
High grade	22½
Radiator valves, standard	30
High grade	30
Patent quick opening valves	60
Basin Cocks—	
No. 0 & 1, Fuller pattern	53
No. 0 & 1, compression	49
Midget	51
Steam cocks, square nut	50
Steam cocks, iron body	45
Globe valves, med. pressure	45
Angle valves, med. pressure	45
Check valves, med. pressure	45
Radiator valves, standard	60
Radiator valves, Jenkins disc	55
Radiator valves, quick opening	65

Conductor Pipe Advances in Price

The discount on conductor pipe has been changed from 45% to 35%. This means an advance of almost 20%. Eavetrough conductor elbows are quoted at 35% off the following list prices: 2 in., $1.90; 3 in., $2.20; 4 in., $3.60; 5 in., $9; 6 in., $10.50. Trade in the foregoing lines has been fairly good, with an improvement quite noticeable of late.

O.G. eavetrough is quoted at 35% off the following list prices: 8 in., $6.90; 10 in., $7.70; 12 in., $9.10; 15 in., $12.50.

All galvanized goods are decidedly firm in price owing to the increased costs of galvanized sheets. Although spelter has declined to some extent there have been heavy advances in the costs of black sheets.

Hot air furnaces have advanced about 33 1-3% since the first of 1916. The last advance of 10% has taken place within the past two weeks.

Flush Valves and Pumps Go Higher

Oil regulating flush valves are now being quoted at $15, representing an advance of $1.25 over previous quotations. Myer pumps used in connection with gasoline or motor power pumps are now quoted at 20% off list instead of 25% as formerly. Many repair parts of cylinders, pump leathers, etc., have gone up about 20%.

Tinners' Machines and Tools Up 20 Per Cent.

A considerable advance in the price of tinners' machines and tools has gone into effect, which amounts to 20%. Some of the machines affected are squaring shears, bar folders, stovepipe formers, stakes, raising hammers, setting hammers, eavetrough hammers and solid punches, together with other lines. Here again the high price of iron and steel has made it necessary for the manufacturers to realize higher prices.

Gasoline and Oil Storage Tanks Up

Another advance of 10% has been put into effect on the lines of storage tanks for gasoline and oil of various kinds carried by the Imperial Oil Company. This

advance follows a recent heavy advance in the same line of goods, in some instances amounting to 23%. The high price of raw materials and labor is given by the manufacturers as the cause for the higher prices.

Soldier Easier in Price, Declines 1c

Lead products generally are holding firm with the exception of solder, which has declined 1c. a lb. The pig lead market has held firm at $7.50 New York.

Lead pipe, traps and bends, waste pipe, sheets, lead wool, etc., hold at former quotations as follows:

Lead pipe	$0.14
Lead waste pipe	.15
Traps and bends	net list.
Solder, bar, guaranteed	.28½
Strictly	0.26-0.28
Commercial	.24½
Solder, wiping	0.23-0.26
Lead wool	.12
Lead sheets—	
3 lbs. sq. ft., per 100 lbs.	$12.25
3½ lbs. sq. ft., per 100 lbs.	12.25
4 to 6 lbs. sq. ft., per 100 lbs.	12.00
Cut to sizes, 75c. extra per 100 lbs.	

Oakums Have Gone Up 1c to 1½c Pound

An advance of 1c. per pound has been made on the price of U.S. Clipper oakum, which now makes the selling price 18c. On the U.S. Navy (English) there has been an advance of 1½c. per pound, which now makes the selling price 16½c. per pound. Plumbers' spun oakum and the other brands remain unchanged. Following are the quotations:

Plumbers' Spun Oakum	$0.08
U.S. Navy (English)	.16½
U.S. Navy (American)	.18½
U.S. Clipper	.18
Best American	.08

Boilers and Enamelware.

Quotations as formerly quoted still hold good on enamelware and boilers, with the market firm. Business is quiet.

Iron Pipe Unchanged But Firm

Prices on black and galvanized iron pipe remain firm at the figures quoted in last report. Quotations are as follows:

Standard Buttweld.	Black.	Galvanized
⅛ in.	$ 4 00	$ 5 50
¼ in.	3 42	5 55
⅜ in.	3 42	5 55
½ in.	4 42	5 99
¾ in.	5 41	7 53
1 in.	7 99	11 14
1¼ in.	10 81	15 07
1½ in.	12 93	18 01
2 in.	17 39	24 24
2½ in.	27 50	38 32
3 in.	35 96	50 11
3½ in.	45 08	62 10
4 in.	53 41	73 58

Standard Lapweld.	Black.	Galvanized
2 in.	$ 20 35	$ 26 83
2½ in.	30 42	40 66
3 in.	39 78	53 17
3½ in.	49 68	66 70
4 in.	58 86	79 03
4½ in.	68 58	92 08
5 in.	79 92	107 30
6 in.	103 70	139 20
7 in.	138 00	182 10
8L in.	145 00	191 30
8 in.	167 00	220 30
9 in.	200 10	263 90
10L in.	185 60	244 80
10 in.	239 00	315 20

Metal Markets Are Slightly Easier

Following peace rumors the metal markets have been rather unsettled and prices in the United States have declined in some instances. Business is good, despite the usual holiday quietness.

There is a good demand for copper and the price has declined slightly, with 37 to 38½c. being quoted. Tin is also easier and is quoted locally at 46-47½c. a lb. Spelter is quoted at 14-15c. The lead market although dull is still holding at former levels. Locally the price is 9½c. a lb.

Antimony is unchanged at 18c. lb. and aluminum at 68c. lb.

Prices on domestic pig iron are still withdrawn, and no information is available as to when new quotations will be issued. Stocks of foundry iron have been exhausted, and Canadian furnaces have no pig iron of this grade to sell. The market is quiet, with the situation unchanged. In the United States the pig iron market is also quiet, with prices unchanged.

The iron and steel markets in the United States are on the whole decidedly quiet, due partly to the peace proposals and also on account of the holiday season, the market being usually quiet at this time of the year. There is no sign of weakness in prices, and none is expected in the meantime. The transportation situation appears to be growing worse, and, if there is no improvement in the near future, it will result in the mills curtailing production.

PRACTICAL SHEET METAL WORK

(Continued from page 26.)

end of the pipe is always put into the extreme edge as shown. Fig. 6 is a cone, and pattern for same.

First the elevation A,B,C, is drawn. Next the plan.

This is divided into equal parts, 1, 2, 3, 4, 5, etc. To develop the pattern, place point of compass at A in elevation and open up to C, and with a in Fig. 7 as centre draw arc b c and transfer the measurements from plan in Fig 6, to arc Fig. 7. Allow extra material for whatever kind of seam or joint is to be used, and the pattern is completed.

Fig. 8 is a very similar problem and the elevation will be found to be exactly the same as Fig. 6, but the plan is square. This will make a pyramid.

To develop pattern Fig. 9, the same course is followed as in Figs. 6 and 7 except that the arc a, b, c, is only divided into four equal parts, as at 1, 2, 3, 4. 1, by drawing a line from 1 to 2, 2 to 3, etc., the pattern is complete, not omitting the allowance for joint.

In Fig. 10 is shown how the pattern for a bucket is developed.

First draw the elevation A B C D, and continue the lines AC and BD until they meet as at point E. Next, with E as centre, draw an arc as shown.

Then draw a plan and divide into any number of equal parts and transfer these measurements to the arc just drawn. In this case only one-half the pattern is developed.

(Continued in next issue.)

PLEASE NOTE.

The Following Is the Wording Which Appears in the Face-Smile of Address Recently Presented to John Wright, Toronto.

The Toronto Society of Domestic Sanitary and Heating Engineers. To Mr. John Wright.

Dear Sir,

The officers and members of this Society have for some time past been desirous to show to you in some tangible form their appreciation of the great services you have rendered them.

To the noble efforts of yourself may be attributed in a very large measure the success which has followed our Society since its incorporation by the Government of Ontario.

We have always admired you for your whole-hearted, unselfish and generous treatment of every one with whom you have had relations both business and otherwise.

Your efforts to improve our standing since our incorporation, and your work municipally in this connection, have been of great and lasting benefit to all who are associated together for the benefit, comfort and health of our people; and the sanitary improvements of the homes of this city and province.

In asking you to accept this address, as a souvenir of our affectionate regard and esteem, for one who is not only a good and true man, but one who has also proved himself under all circumstances, to be Our Dearest Friend, we bespeak for you in the time to come a long continuance of health, happiness and prosperity.

(Signed) Garrett F. Frankland, Secretary

(Signed) Fred H. Gentle, President,

Toronto, 20th December 1916.



THE MANUFACTURE AND USE OF GAS

A VERY interesting lecture upon the manufacture and use of gas was delivered and illustrated by lantern slides in the St. Andrew's Church Hall, on December 5, by Geo. W. Allen, educational director of the Consumers' Gas Co., Toronto. A very appreciative audience attended. Mr. Allen no doubt has this subject down to a T, and those who listened to his words left the meeting thoroughly convinced as to the service value of gas.



GEO. W. ALLEN,

Educational Director, Consumers' Gas Co., Toronto.

One very interesting feature about Mr. Allen is the fact that he is an electrician by trade, and at one time took a very great interest in the use of electricity. Mr. Allen is a true friend of true and efficient progress, and he has, therefore, taken up the championship of gas and its use.

Another thing which proved a great surprise to his hearers was the statement that even apart from the gas manufactured and used (and Mr. Allen described hundreds of ways in which gas is being used), there are a large number of by-products which are actually necessary to humanity, and even if the gas used were to be thrown away, the by-product would have to be made all the same; and, while admitting the advantages of electricity, he showed that gas is necessary because of the by-products which could never be produced by electricity.

Mr. Allen has just returned from a lecturing tour in the United States, and has been called upon by quite a number of societies in Toronto to deliver lectures.

The following is a list of lectures to be delivered:

January 5, 1917—Canadian Business Women's Association, 114½ Yonge St.

January 15, 1917—Westminster Presbyterian Church, Bloor Street E., between Yonge and Church.

Other lectures to be held at a later date will be announced in these pages.

AN OLD PIONEER

When we speak of a real pioneer these days we refer to a person who has truly seen life in all its ruggedness, on mountain, river and lake, particularly a Canadian pioneer. Railroad adventures, mining, etc., all have their quota of pioneers, and the old time plumber and fitter can tell some very interesting stories, especially if he has made good and is still making good.

One of these pioneers can be found in the person of Alderman A. D. Cross, Port Colborne, Ont.

Alderman Cross is the owner of a fine hardware store which is a part of his sanitary and heating business. He belongs to the old line of pioneers. In his early days he drifted west from the canal town, spending many years of his life on the Pacific slope from Oregon to Alaska, in which period he gained a lot of valuable experience in mining and railroad construction.

Mr. Cross can tell some very interesting stories of the fights between some of the railway companies for crossings and terminals in the early days of railroading on the coast.

In his home town he has the reputation for square dealing and the townspeople know full well that the "yea, yea, and nay, nay" of Alderman A. D. Cross can be relied upon.

He is an active member of the town council, where his wide experience proves of real value.

TORONTO SOCIETY DOINGS.

The Toronto Society of Domestic Sanitary and Heating Engineers held their last meeting for the year on Wednesday, Dec. 20, at the rooms of the society, 22 College street. A large gathering was in attendance.



A. D. CROSS,

Port Colborne, just leaving a new school building in which he is installing the heating and plumbing.

The affairs of the society were never in better condition since the society was formed over 30 years ago. This speaks volumes for those who have diligently labored so long in the interest of the trade as well as those in harness at this day.

The outlook for better trade conditions and relationship between the craft and the supplymen and managers was never brighter, which goes to show that things have been moving in the right direction.

The steady increase in membership was again evidenced when two new

members of the craft qualified in the persons of Newton J. Walters, of the firm of Walters Brothers and Charles Locke of Locke Brothers.

SANITARY COMMITTEE'S REPORT

The chairman of the Sanitary Committee submitted a very interesting report on a number of lines that are being used in sanitary plumbing upon which the chlorine that is being used in Toronto water is reacting to some extent. Mr. Wright holds the opinion, and rightly so, that certain supplies used by the craft should be submitted to responsible members of the trade, before being put on the market, so that actual working tests, under working conditions can be made. In his report he proved the force of his arguments in a very practical manner.

Concluding his report he moved a vote of thanks to the Canadian Wolverine Co., Ltd., and The Good Mfg. Co. for their kind co-operation with his committee in furnishing free a number of lines for testing purposes.

Nomination of Officers.

The following members were nominated for the coming year:

President—Fred H. Gentle.
Vice-president—Thomas Ferguson.
Treasurer—Thomas Maxwell.
Secretary—Garrett F. Frankland.
Warden—George H. Cooper.
Tyler—A. F. Passmore.
Auditors—A. H. Read and W. R. Daniels.

The Executive Committee for 1917 will be appointed at the next meeting which will be held Wednesday January 17, as will also the election of officers.

HISTORICAL PRESENTATION

John Wright receives beautifully hand-engrossed emblem as a token of esteem from the members of the Toronto Society.

THE most pleasing event of the year in connection with the doings of the Toronto Society, took place at the close of their last meeting, Dec. 20, when Bro. John Wright was presented with a beautifully illuminated address by the members of the society.

Before the presentation, the president requested Messrs. Legrow and Hicks to escort Mr. Wright to the chair. Addressing Mr. Wright, the president said: "Brother Wright, the members of this society take great pleasure in presenting to you this address as a slight token of the respect which we feel towards you. When we recall all the good work which you have done; when we look around and see so few who in days gone by, labored in the interest of this craft, and know that the city of Toronto holds lasting and striking evidence of the hard work which you and your late associates have done, we feel that we cannot let more time pass without expressing ourselves in some lasting and tangible manner.



JOHN WRIGHT, TORONTO,
to whom the illuminated address was presented by the Toronto Society of Domestic, Sanitary and Heating Engineers

We realize that words cannot express the gratitude which is deep down in our hearts, and we sincerely trust that you will enjoy many, many years' membership in the Toronto Society of Domestic, Sanitary and Heating Engineers.

Replying, Mr. Wright thanked the members, but wished to be excused from any speechmaking. Said he: "I am no speechmaker, gentlemen, and even if I were, you have entirely robbed me of speech by this splendid token which you have presented me with. I do not recall a time when I felt so great an interest in the work of our craft and its important place in society. I do not know why you should have done me this honor, but I do know that I have the interest of



Fac-simile of Illuminated Address presented to John Wright, Toronto.

the profession at heart and with these thoughts in mind I also remember that those members, many of whom have crossed the "Great Divide" have been a great inspiration to me in days gone by. This beautiful address will urge me on to greater things, greater accomplishment, knowing full well that the work to be done is being silently appreciated.

"Brother craftsmen, let me conclude by thanking you heartily, and I trust that the confidence you have bestowed upon me by this act of yours will not be misplaced; that I may be given health and strength to work for the good of the society, knowing full well that upon its success depends greatly its usefulness to humanity at large. I wish you all a Merry Christmas and as Happy a New Year as these warring times will permit."

The members greeted these remarks with loud applause as Brother John Wright retired to his seat.

Secretary Frankland placed the address on the dais for inspection.

Thus was brought to a close one of the most pleasant and enjoyable meetings that it has been the good fortune of the Toronto Society of Domestic, Sanitary and Heating Engineers to have held, and justly so considering the honor and esteem that is, and will always be, due to that prince among men, John Wright, of Toronto.

A WELL LAID OUT JOB

In many a building these days extensive alterations are taking place which include the remodelling or installing of plumbing fixtures, and very often the room for lavatory accomodation is limited, the piping too has to be installed on the top of the existing floors. Such conditions require no small amount of study so as to provide easy flow of wastes, and adequate fall towards the soil pipe stack.

The accompanying view shows the "roughing in" for two toilet rooms, ladies' and gentlemen's comprising the following fixtures: Ladies' lavatory, two W.Cs., two lavatories and one slop sink. The gentlemen's, two W.Cs., two urinals, and two lavatories. The whole is properly back vented and a system of local vents too is provided, the room allowed was approximately 20 feet x 7½ feet each from the old existing wall. All the vents and waste pipes were to be concealed and a depth of floor limited to 11 inches at the finished grade.

It will be seen that the piping has been well planned in every detail.

One feature about this installation is that the owner desired to have a photograph taken so as to know what the piping under the floors consists of as well as their location, so that in the event of any trouble arising by chokage, the photo would assist considerably in locating the trouble.

Without doubt the sanitary engineer as well as the journeyman deserves no small amount of credit for the work.

CONTRACTS AWARDED.

The Toronto Board of Control has awarded contracts for the following materials:—Brass work for house services, H. Mueller Mfg. Co., Sarnia; special castings, Reid & Brown Structural Steel & Iron Works; double stop-cock boxes, the Dominion Wheel & Foundries Ltd.; 6-in. valve boxes, 4-in. valve boxes, iron castings of manholes, gullies, etc., John T. Hepburn Co., Standard Foundry, Reid & Brown, Don Foundry Co., Dominion Wheel & Foundries; pipe fittings and valves, James Robertson Co., James Morrison Brass Mfg. Co.

A NEW TANK FLOAT

One of the latest improvements to be made which will interest the whole of the plumbing trade, is that of a new tank float. It is not a metal one, and is jointless. Non-corrosive and practically indestructible. These and many other claims are made for what will be known as the Vitro tank float. The sole manufacturers of this float are the Cluff Mfg. Co., Sterling Road, Toronto, from whom further particulars may be procured.

APPOINTED SALES MANAGER.

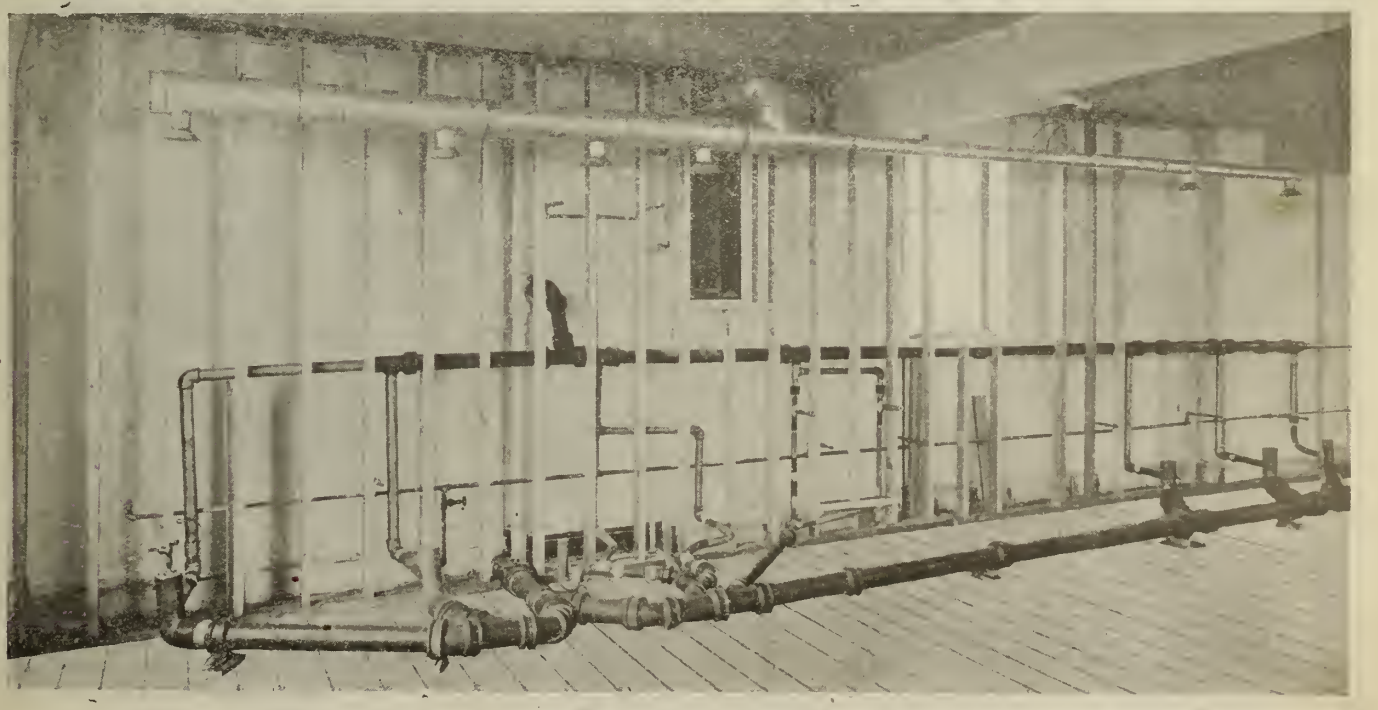
H. S. Southworth has left Steel & Radiation Co., Toronto, to take up the position of sales manager for "Stellite" as manufactured by the Deloro Mining & Reduction Co., Toronto.

LITTLE THOUGHTS

The strength of a chain is its weakest link.

A home is only sanitary in so far as it contains sanitary plumbing fixtures.

About the only thing one gets for nothing is the string with which the parcel is tied up.



Roughing in for eleven sanitary fixtures, venting, etc., at close quarters.

PRACTICAL SHEET-METAL WORK

THREE PIECE ELBOW WITH GUSSET OR GORE PIECE.

BY THOMAS STANFIELD

IT would be difficult to imagine any kind of work-shop where material is more easily wasted than in a tin-shop. The reason for this is on account of the peculiar shape of some patterns.

At the same time many a man may easily save the price of his wages if he studies the various ways in which a pattern may be cut. Fig. 1 shows how a lot of waste is made. While Fig. 2 shows that by making a pattern in halves it is possible to get three half pieces out of the same size piece.

Fig. 3 shows plan, elevation and pattern of a cylinder, or round pipe along with two examples of how the seam can be made.

To develop a pattern for a round pipe, first draw an elevation A. Then draw plan B, and divide it into equal parts and even in number as shown 1, 2, 3, 4, 5, 4, 3, 2.

Now draw stretchout line a b and transfer measurements from plan. Next draw perpendicular lines from a5 and b5 equal to the length of pipe. Next connect these two perpendicular lines as shown by line cd.

This will complete pattern desired.

In Fig. 4 is shown a plan, elevation and pattern of a square pipe. It will be seen that the elevation is exactly the same as that shown in Fig. 3, but the plan shows that a square pipe is desired.

The elevation is first drawn, then plan as shown 1, 2, 3, 4, draw the stretchout line ab equal in length to the four sides as described, erect perpendicular lines and join by a line cd in the same manner as shown in Fig. 2.

Allowance for seams or locks must be made, and a number of examples are shown in this Fig.

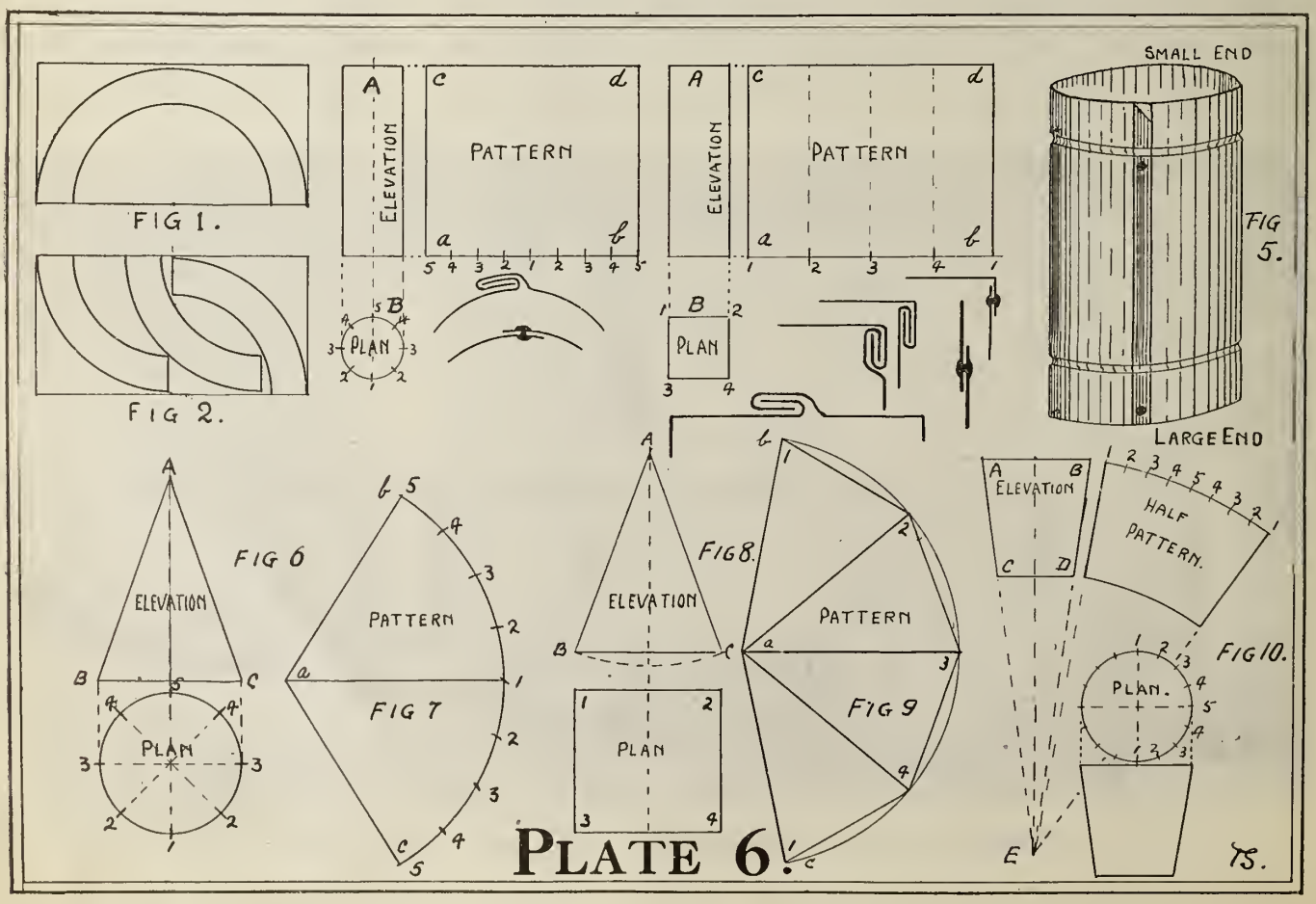
If a simple lap joint is to be made simply allow one width of the lap more than actual length of pattern. If a seam such as is shown it will be necessary to allow three times the width of the seam, this is done by adding twice the width at one edge and one width at the other edge. By examining the enlarged views of the seams this will be seen.

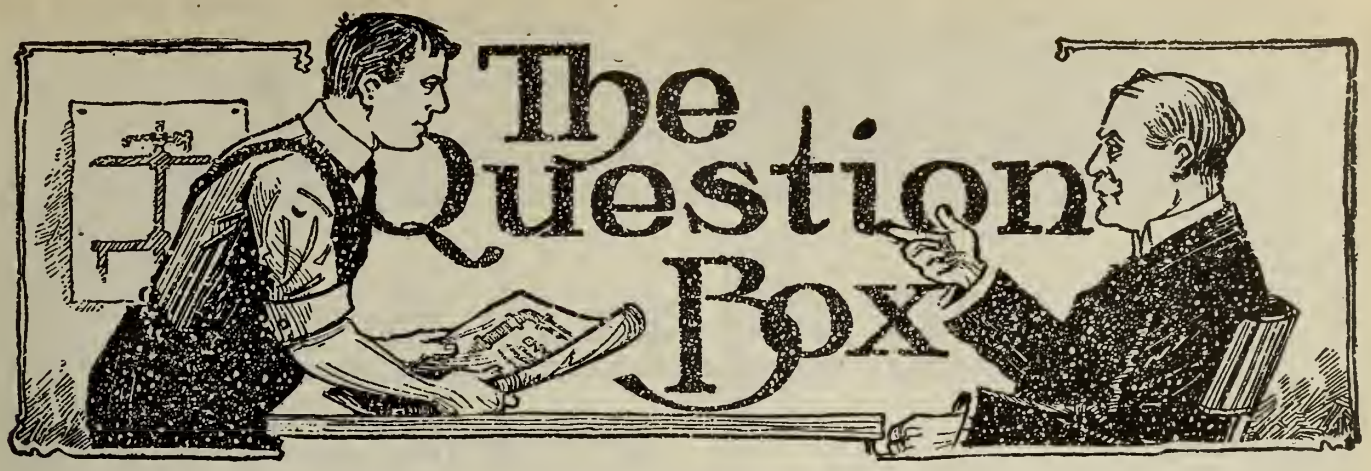
The perspective view of a stove pipe is shown in Fig. 5. It may seem a simple matter, but the writer has seen scores of hardwaremen who could not tell which was the small or large end of a pipe without trying the joints.

In making stove pipes it is a recognized practice to cut the corner off the small end, this is shown on the top of the seam.

Then again when the seam is riveted, the rivet in the small end is always below the bead and the rivet in the large

(Continued on page 22.)





Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

NO HOT WATER

Editor the Sanitary Engineer.

Being a subscriber to your valuable paper, I saw in a recent issue an article describing a case where there was too much water.

I have a case in mind in which the trouble is that there is no hot water. Can you tell me why this will not work? Several men have been to the same house to try to get hot water, but without result. Two new water fronts were tried and still no hot water. Then a new stove was tried. Again no hot water. At last the owner fixed a new boiler in the kitchen close to the stove, hoping to get plenty of hot water, but when completed the water was as cold as ever. Can you solve this problem for me? The last time I saw the occupant of the house I asked him if he had any hot water yet and he said he had to keep another fire by the boiler to keep it from freezing. Enclosed sketch shows how it is piped up.—Plumber, Belleville.

The above description of the trouble is scarcely fully explained; for instance, the size of the boiler is not given. Neither is the size of the water front given.

However, if our inquirer will look at Figs. 1, 2, 3 and 4, which refer to trouble for want of hot water from a domestic coil which is inserted in the fire box of furnace, he may be able to discover what is wrong. One thing that may cause the trouble is that some of the pipes may be pitched the wrong way or possibly there is some obstruction in the bottom pipe; though at first glance there does not appear to be very much wrong with the installation.

It is quite another thing, heating water with a domestic heater which lays flat, thus permitting the heat to strike the two or more heating surfaces, as against heating water with a water front, because in the latter case the heat generally starts circulation by coming in contact with the lower part of the water front first, and once circulation is established it will be maintained so long as sufficient heat is applied.

We would suggest that the job be gone over carefully, all the pipes reamed, and see that they all pitch to and from the boiler. The top pipe pitched up to the boiler and the lower pipe down from the boiler. Fig. 1 is a reproduction of sketch of job that is causing trouble, and Fig. 2 shows a suggestion as to the way to cure the trouble, that is, in the absence of fuller particulars.—Editor.

CANNOT GET HOT WATER

Editor the Sanitary Engineer.

I have recently connected the range boiler to a small heater in a hot water furnace and enclose sketch of the job. The pipe is all ¾ inch galvanized. The pipes that run horizontally on the ceiling of the basement from the heater to the boiler in the kitchen are about 26 feet long. I can get scarcely any hot water except when there is a fierce fire on. Can you suggest a remedy and at the same time explain why this job does not work.

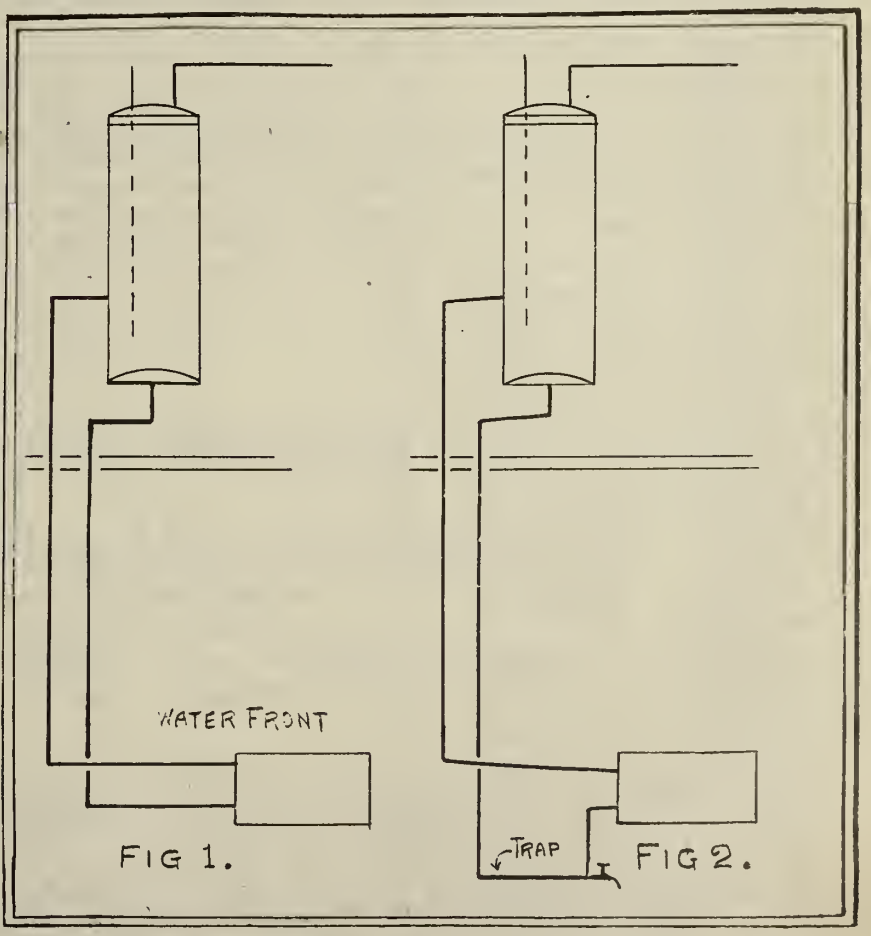


Fig. 1 submitted by Plumber, Belleville. Fig. 2 is suggested as improvement.

It is one thing to be shown how a job can be remedied and another to know what prevented it working in the first place. —T.S.R.

The sketch submitted with the above question is shown in Fig. 1. The enlarged sketch Fig. 2 shows what should be done to remedy the trouble, and Fig. 3 shows what is taking place.

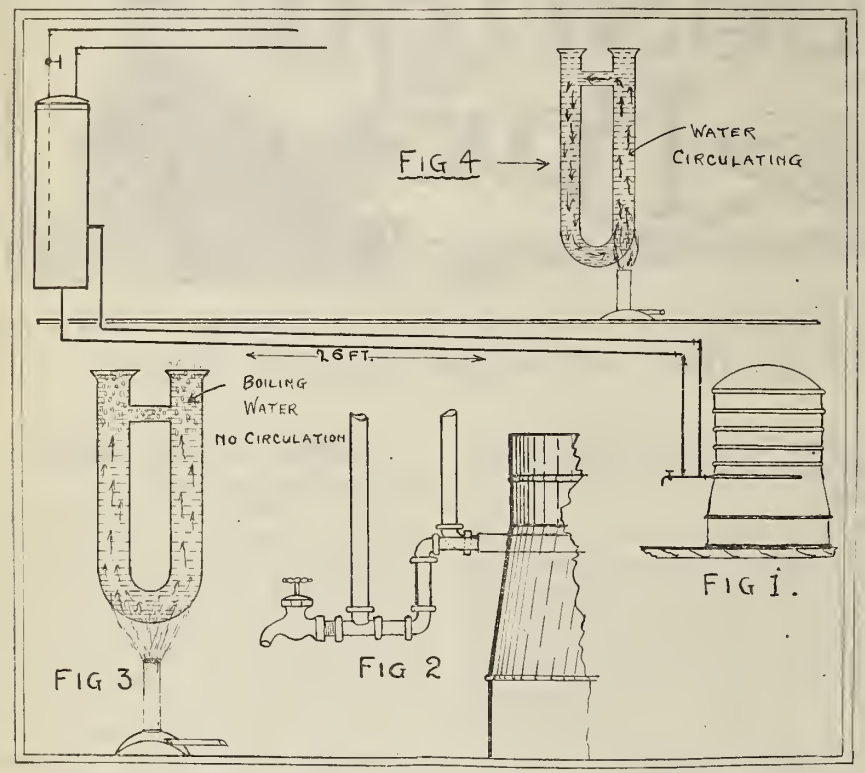


Fig. 1, submitted by T.S.R. Fig. 2 shows how it can be remedied. Fig. 3 describes why Fig. 1 does not circulate. Fig. 4 shows the principle governing circulation.

It will be noted that there are two long runs of horizontal pipe. Very well, there are two terminals, as it were, at the end of these two pipes, the heater is one and the range boiler is the other.

It might be argued that such is the case in every instance where a heater and range boiler are similarly connected. Such is not, however, the case. The principle upon which all hot water systems, whether hot water supply, as in this case, or hot water heating systems are governed is, that both heater and boiler must be on a line of, say, unbalanced circulation and not installed so that the contents of either heater or boiler are in a line of resistance.

Just examine Fig. 1. Both pipes are nearly the same length, there is very little difference. The water in the heater is lying in a horizontal position, the heat comes in contact with both sides of the loop of the heater, and begins to expand equally, thus it will be seen that there is almost an equal resistance against each pipe at the boiler.

Now, look at Fig. 3, the same condition prevails and no circulation is set up. Now examine Fig. 2, which shows a trap on the pipe which leads to the bottom of the boiler. By placing this trap as shown the two pipes are unbalanced and the heater is practically situated on the shorter pipe, or more resistance is created on the bottom pipe, thus relieving the resistance in the upper pipe, or the one connected to the side of the boiler. Fig. 1 is installed in just the same way as if both the flow and return from a radiator were to be connected to the top of the furnace. While Fig. 2 is simply establishing a condition which prevails in the regular flow and return headers of an ordinary hot water furnace. Just as is shown in the sketch Fig. 4.—Editor.

WATER BY-PASSES ON THIS JOB

Editor the Sanitary Engineer.

Can you enlighten me on the enclosed plumbing job?

You will see that the return from the furnace coil is connected at the top through a ¾ x ½ x ¾ tee, the return enters the ¾ side and the ½ inch goes down to the bath basin, etc. As the sink is so far away I had the pipe returned to connect at the side of return pipe to the furnace.

I put in a ½-inch swing check valve so as to not draw the water back through the bottom of the boiler, which it previously did, and now since I put the check valve on the bath and basin taps do not seem to run so freely, also the circulating pipe does not get hot from sink to furnace.

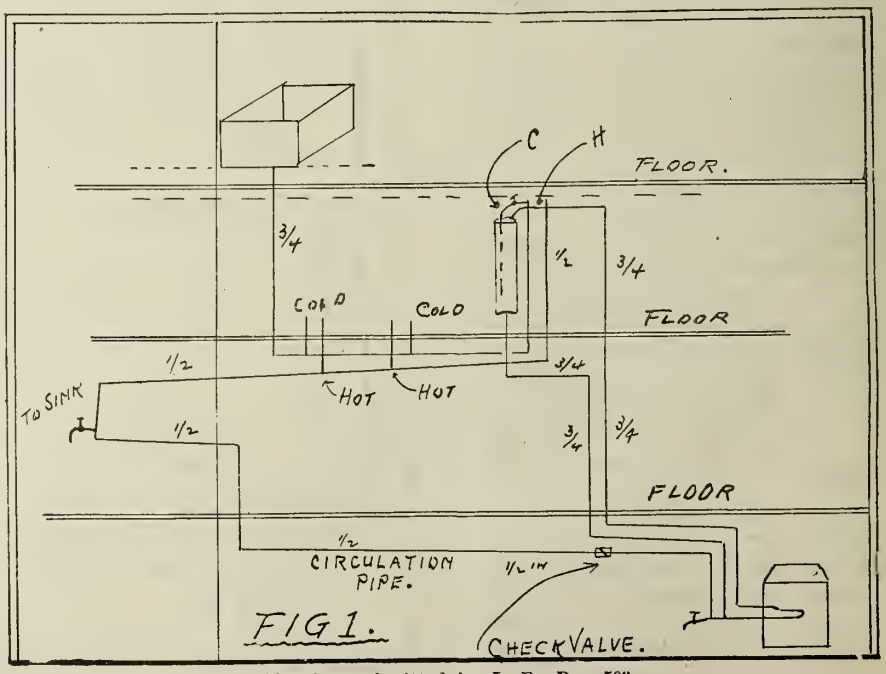
Would it be better to put the check valve close to the return at the coil? Or would it be good to close the opening inside of this pipe, say, to about ⅛ inch just to allow a circulation, so as to obtain hot water quickly at the sink and leave check valve off altogether. See sketch shown enclosed.—L.B., Box 503.

In Fig. 1 is shown the layout referred to by L.B.

It will be noted that the top pipe from the coil in the furnace is connected to the top of the range boiler, and that a pipe is run from this top pipe at the boiler to the various fixtures, and on to the bottom of the coil or return pipe in the furnace. The boiler is practically by-passed in a sense.

No circulation pipe should be so connected that it is possible to by-pass the boiler under any conditions, simply because the boiler is really the reservoir

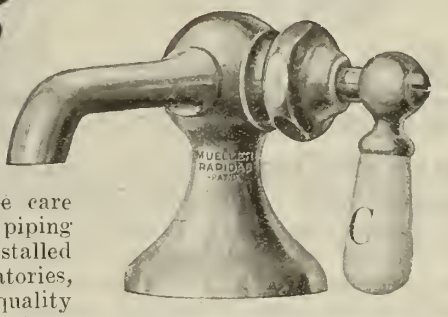
(Continued on page 30.)



Sketches submitted by L. B., Box 503.

IN A CLASS BY ITSELF

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Just Read This—

When you have exercised all the care possible in the laying out of the piping in a building; when you have installed the fixtures, such as Baths, Lavatories, Sinks and Laundry Tubs, be the quality or design the very best;

You can make the whole installation poor by attaching poor brass goods.

Mueller Brass Goods improve the poorest fixtures. Make both appearance and lasting service a certainty.

Raise the standard of your work by installing this high-grade line. There are only a few dollars difference in price, on an entire house job.

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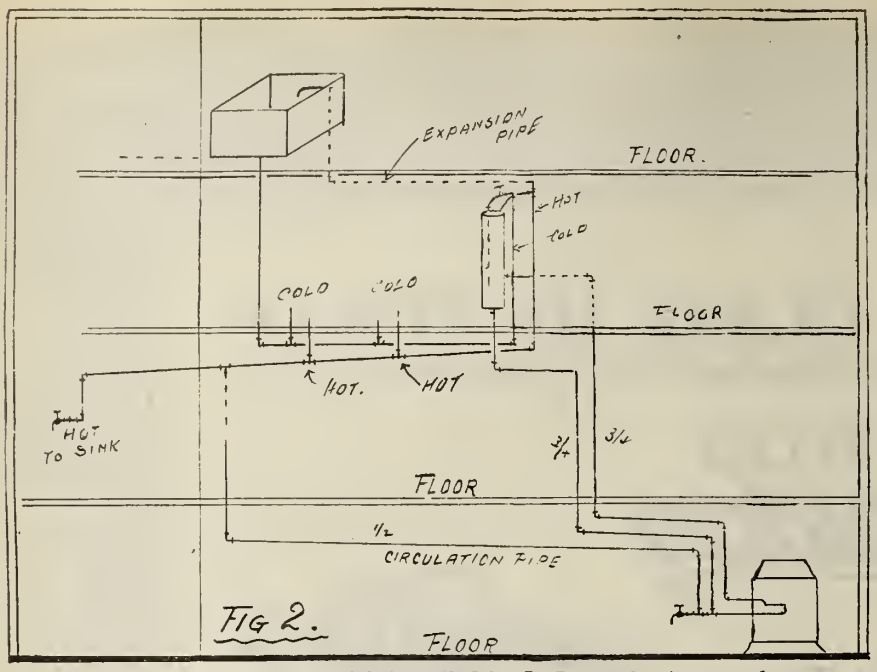
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Suggesting how the job installed by L. B. can be improved.

WATER BY-PASSES ON THIS JOB

(Continued from page 28.)

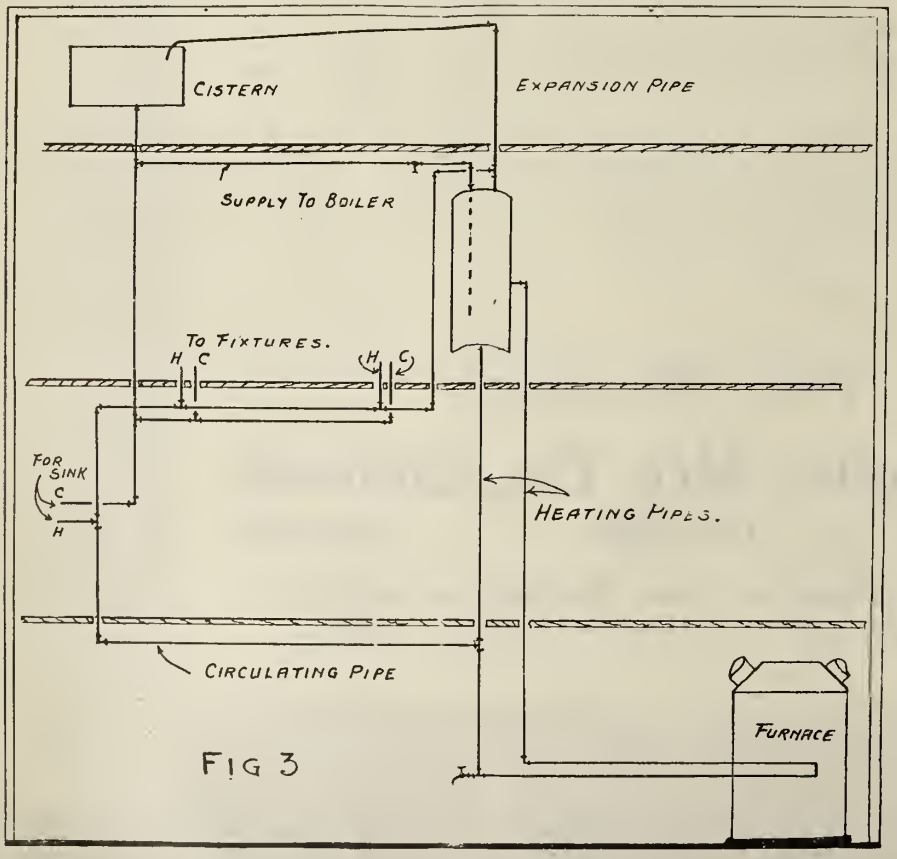
from which the hot water is to be drawn.

It is very seldom that a check valve is required in such an installation and upon no condition should a check be used if it can be dispensed with in any way.

Fig. 2 shows how this job can be improved and without knowing exactly the layout of the job it would be advisable to make the changes shown by the dotted lines, an expansion pipe should be fitted to this job by all means.

It will be seen that the heating pipe which previously was shown to run to the top of the boiler is connected to the side and thus prevents the by-passing of the boiler.

Fig. 3 shows how this job should have been installed at the first. It will be seen that the boiler is heated independently, and that there is no check valve fitted in. —Editor.



How L. B. should have installed the job in first place if conditions would allow.



Saving or Wasting?

The manner in which you handle the drinking water problem in your plant may seem to be a small matter to you —but investigate. The results will be surprising.

The old-time faucet is costly. Running hour after hour, day after day, its ceaseless flow is costing you money, yet without any better service.

Puro Saves 35%

A Puro Sanitary Drinking Fountain will cut that water bill 35%. We can prove that it has done that for others.

It will give every employee a safe, saner draught of bubbling water free from the contamination of the common drinking cup.

In a word, it is the only sanitary Drinking Fountain that is really safe. sanitary, simple, automatic in control, and easy to attach.

"PURO-FY"

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YOUR WATER SUPPLY

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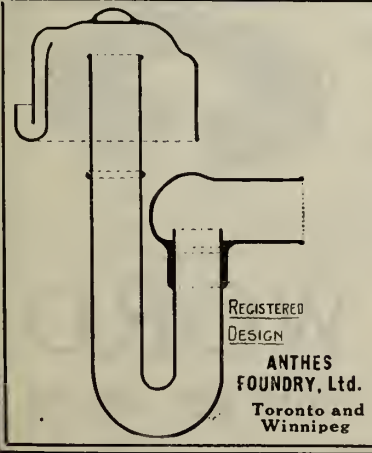
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Ask us about our inside vented syphon. It's a dandy. Saves making many joints.

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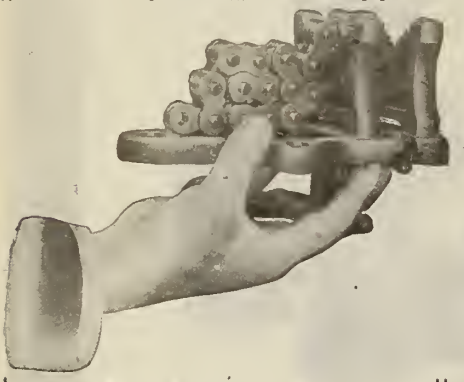
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Better go prepared and clinch a life-long customer on your first visit.

They won the "Grand Prize" of the P.P.I.E.

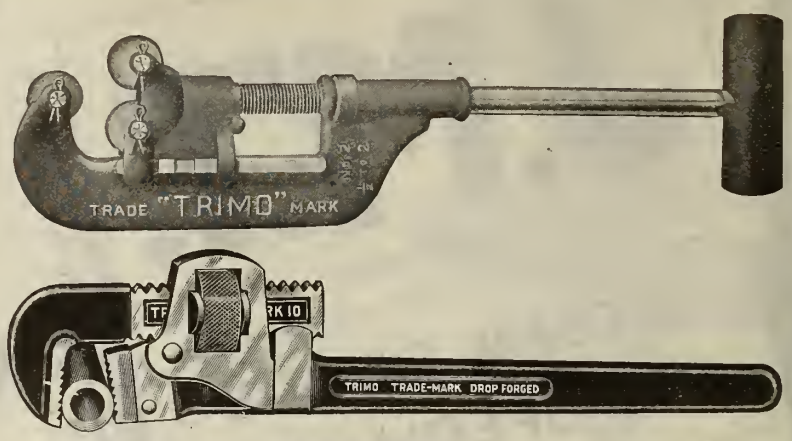
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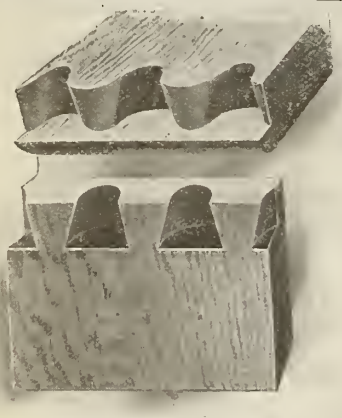
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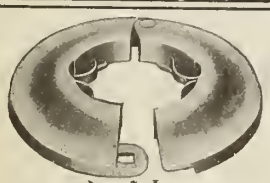
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The standard for years, and carried by the leading supply houses.

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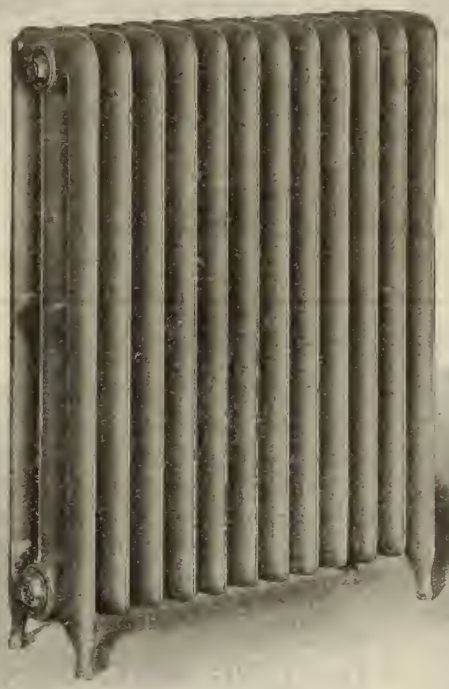
It is a Business Builder.

NOT only is Imperial Radiation properly designed to assist free circulation of water, but it is smooth inside so as to avoid all unnecessary friction.

THIS means that Imperial radiation is good. It is effective and will give off more heat per square foot than radiation which is improperly designed.

IMPERIAL radiation is therefore a **Business Builder.**

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Phone Adelaide 2180 for further information.

Consumers Gas Company
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FULLER

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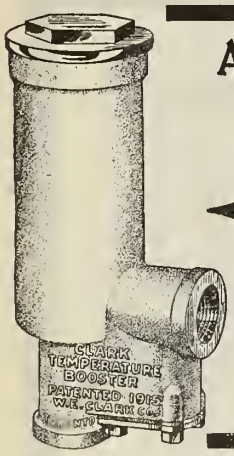
TEMPERATURE CONTROLLING APPARATUS, whether for home or factory, tank or digester, should be the best. The engineer to specify should be the biggest. Specify the CRANDON for SERVICE We can furnish the man and the goods.

Write for booklet to-day.

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Boosts Temperature. Boosts profits, and will build up a reputation for every one installing the Clark Temperature Booster.

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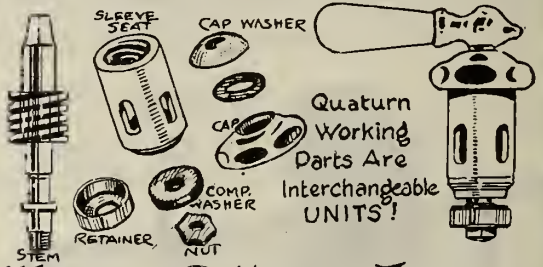
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"OPENS WITH A QUARTER TURN CLOSES WITH THE PRESSURE"



What Other Faucet Has Removable Seat And Interchangeable Working Parts? Send For a Trial Pair: Test Them For Yourself.

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WALLACEBURG, ONT.

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Air Line Systems.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Air Valves.
Empire Mfg. Co. Ltd., London, Ont.
Canadian Wolverine Co., Ltd., Chatham.
Beaton & Cadwell Mfg. Co., Ltd., New Britain, Conn., U.S.A.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Asbestos Goods.
James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Empire Mfg. Co. Ltd., London, Ont.
Canadian Wolverine Co., Ltd., Chatham.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Limited.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Brass Pipe and Tube.
B. O. T. Manufacturing Co., Toronto.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co. Ltd., London, Ont.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Empire Mfg. Co. Ltd., London, Ont.
Canada Metal Co., Ltd., Toronto.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Drainers.
Robert Angus, London, Ont.
Galt Brass Co., Limited.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Closets.
Empire Mfg. Co. Ltd., London, Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Toronto.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Toronto.

Country Residence Equipments.
Aylmer Pump & Scale Co., Ltd., Aylmer, Ont.
Fort Wayne Eng. & Mfg. Co., Fort Wayne, Ind.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Toronto.

Damper Regulators.
W. E. Clark & Co., Toronto.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.
West Toronto Foundry Co., West Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co. Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

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James Morrison Brass Mfg. Co., Toronto.
Kerr Engine Co., Walkerville.

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Galt Brass Mfg. Co., Galt.
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Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

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Warden King, Ltd., Montreal.

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Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Toronto.
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Galt Brass Co., Limited.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
James Morrison Brass Mfg. Co., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

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Ontario Wind Engine & Pump Co., Toronto.

Gas Water Heaters.
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Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Oster Mfg. Co., Cleveland.

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Honeywell Heating Specialty Co., Montreal.
James Morrison Brass Mfg. Co., Toronto.

Heaters.
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Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

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Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Canada Metal Co., Ltd., Toronto.
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Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
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Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
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Galt Brass Co., Limited.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Toronto.
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Steel & Radiation, Ltd., Toronto.
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National Eqt. Co., Ltd., Toronto.

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James Morrison Brass Mfg. Co., Toronto.
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Vitro Tanks
Cluff Mfg. Co., Toronto.

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Fort Wayne Eng. & Mfg. Co., Fort Wayne, Ind.
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National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Toronto.
Empire Mfg. Co. Ltd., London, Ont.

WROUGHT PIPE

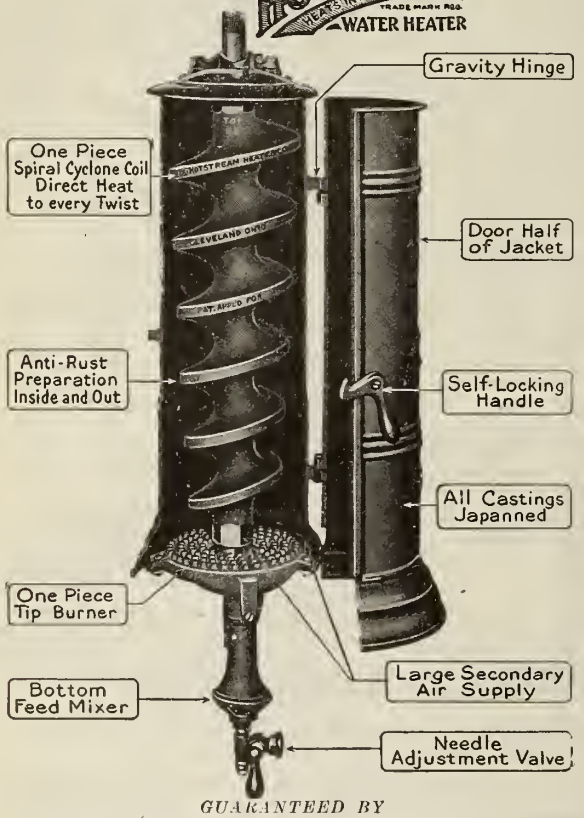
BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES Black and Galvanized All Sizes

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CANADIAN TUBE & IRON CO., LIMITED
Montreal Works: Lachine, Can.

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TRADE MARK REG.
WATER HEATER

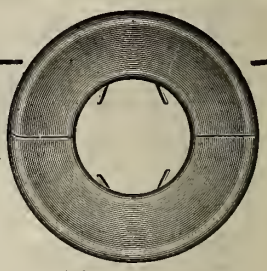


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THE HOTSTREAM HEATER CO. - CLEVELAND



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



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The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

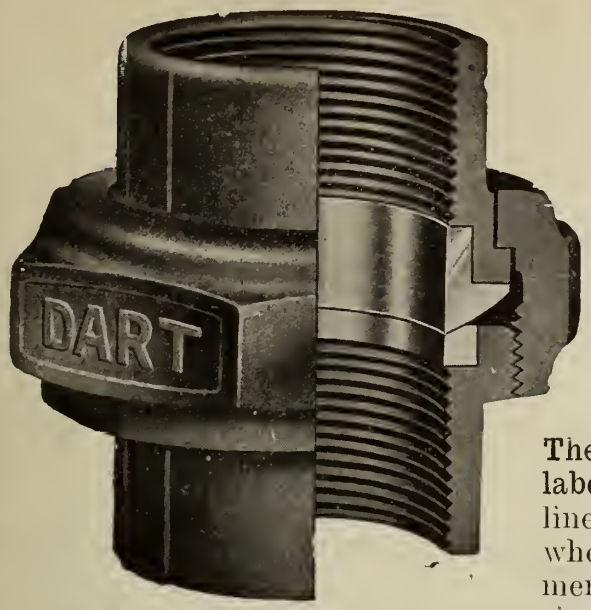
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New Britain, Conn.

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gives top-notch union service

Bronze Face and Seat. No Rust. No Corrosion.

Extra heavy and will not break, stretch or pull apart under strain or heavy pressure.

The "Dart" is a big time and labor-saver because the pipe lines are easily connected, whether in or out of alignment, and its permanent efficiency leaves no room for further attention or complaints.



BRONZE TO BRONZE AT THE JOINT

POSITIVELY GUARANTEED
SOLD BY ALL JOBBERS

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DART UNION COMPANY, LIMITED
TORONTO, CANADA

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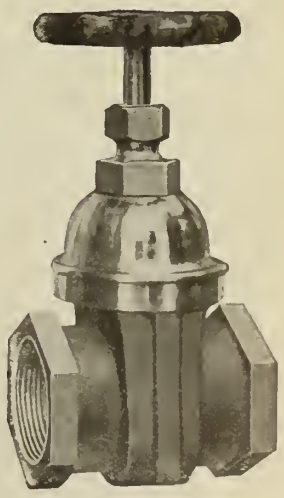
I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.

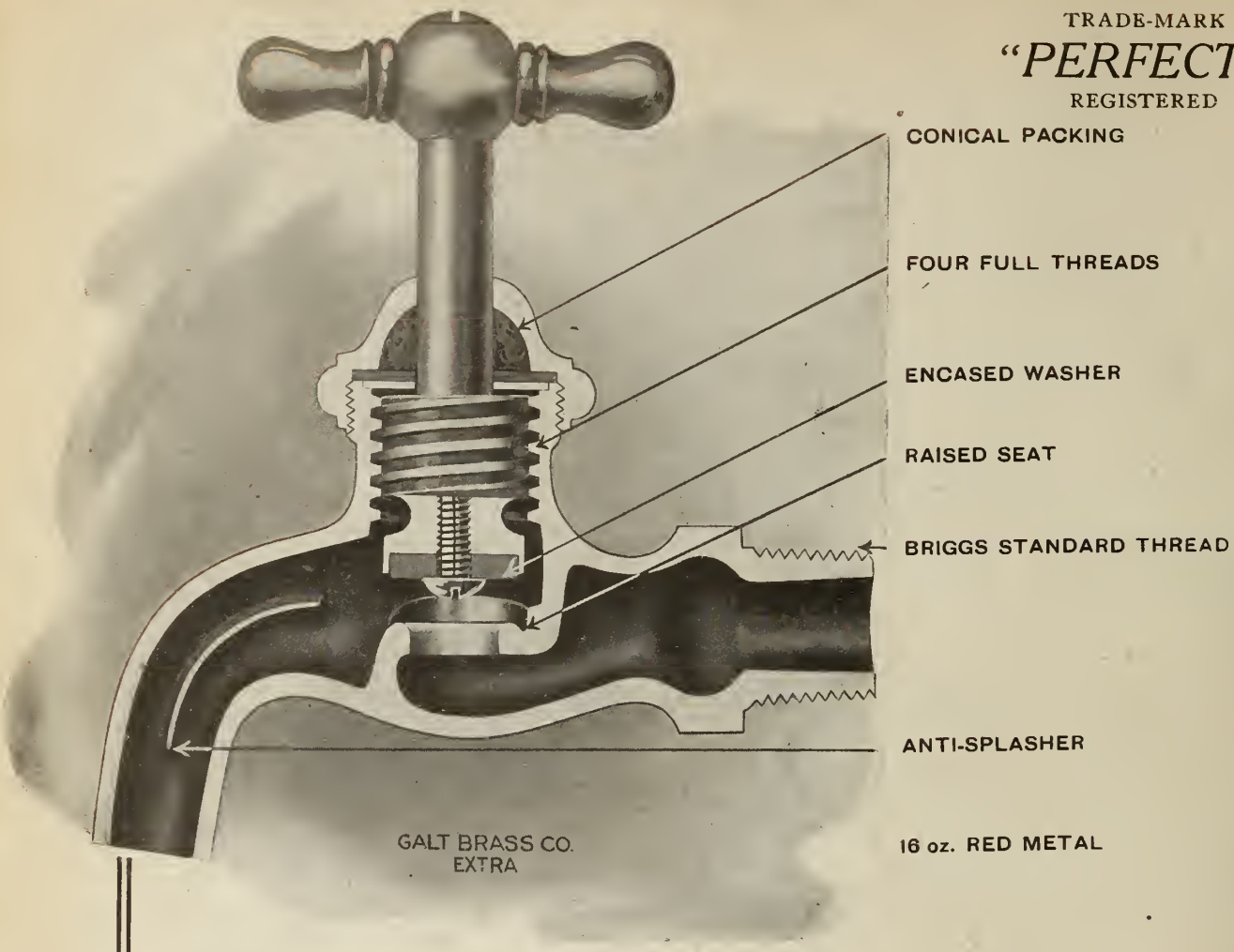


BRASS GATE

THE KERR ENGINE COMPANY, LIMITED

WALKERVILLE, ONTARIO

TRADE-MARK
"PERFECTO"
REGISTERED



The above illustration shows, in actual size, the exact construction of all our Bibbs.

They are all Quickopening. having Double Thread on stem.

The same features are also embodied in all our Bath, Basin and Sink Cocks.

GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

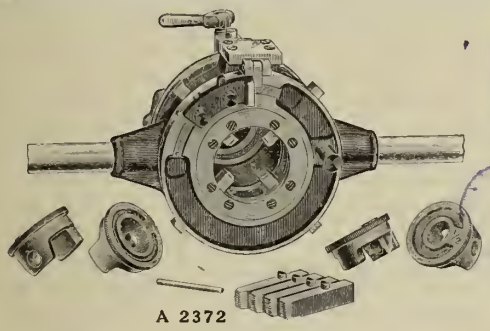
The Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, JANUARY 15, 1917 | No. 2



A 2372

FILE COPY



A 2363

Plumbers' and Steam-fitters' Tools

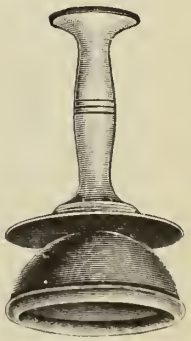
WE carry in stock a complete line of Plumbers' and Steam-fitters' Tools which insures prompt shipment at all times.

We stock only tools of the highest quality and take every possible precaution in order to assure our customers of getting only such tools.

When you buy "Empire" tools you are sure of getting the best value for your money—not merely the cheapest article. This is a good time of the year to look over your stock and have them put in shape for the Spring trade.



A 2350



A 2311

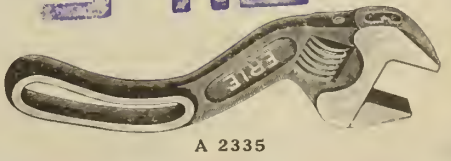
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EMPIRE MANUFACTURING COMPANY, LIMITED

LONDON *TORONTO*

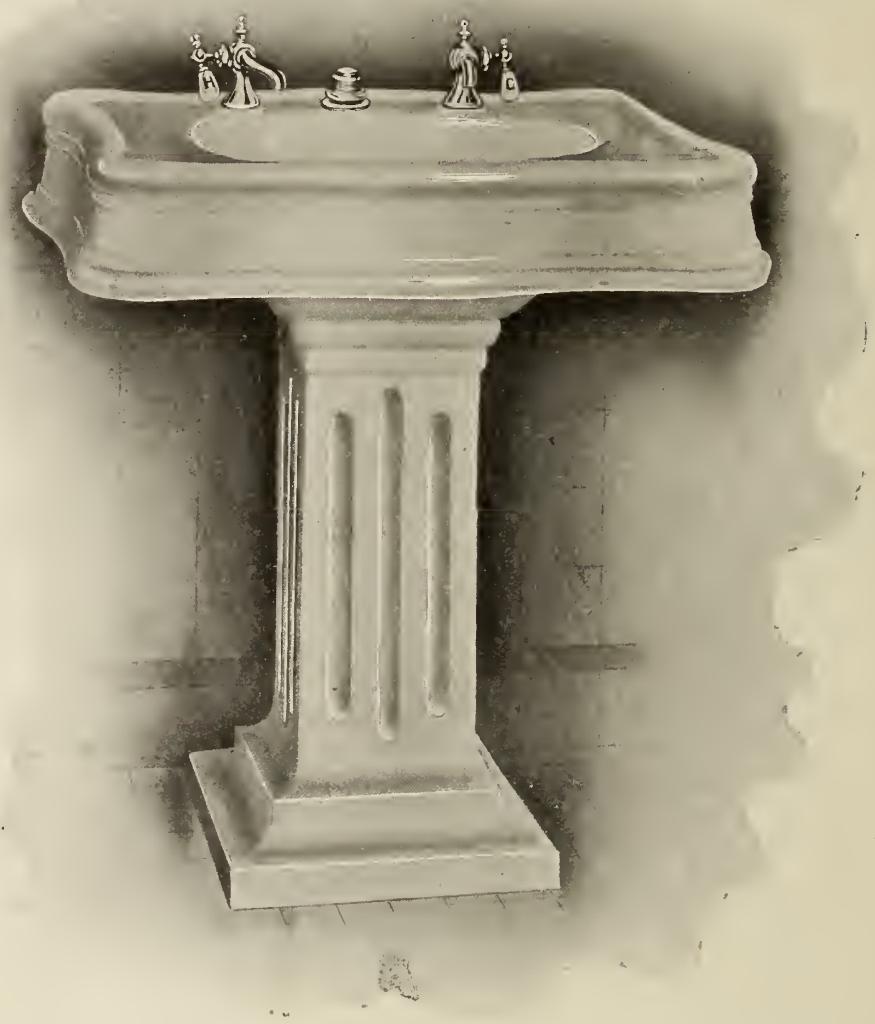


A 2331



A 2335

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

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CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

A few profit-making hints for the *Plumber* who is looking for bigger and better business this year. These are from the Dominion Rubber System line, which is a guarantee that qualities are thoroughly dependable.

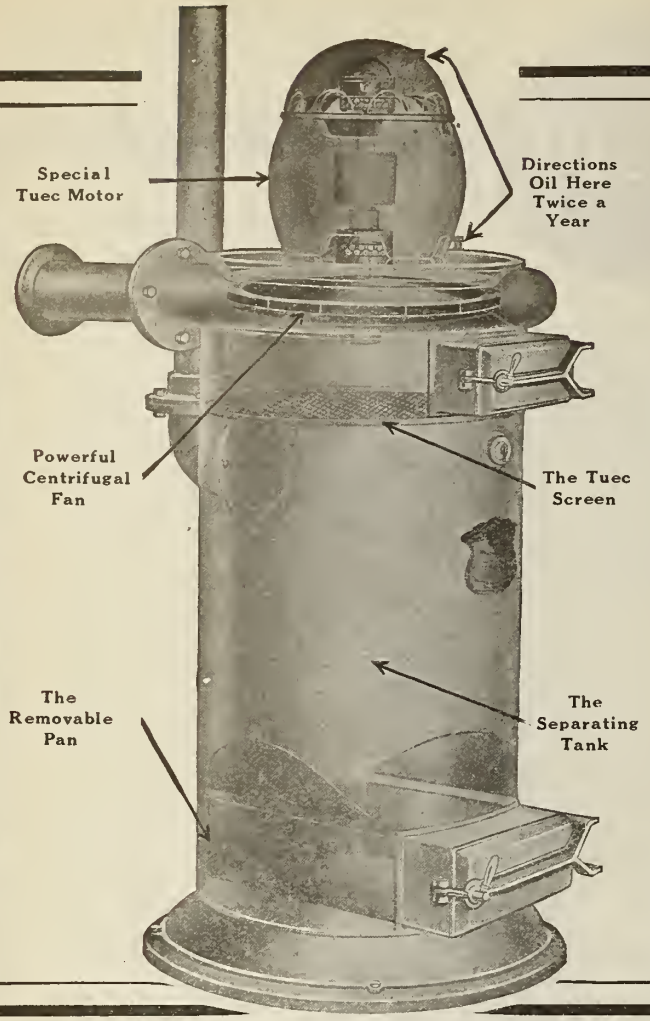
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Diaphragms of all kinds.
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Conical Connections.
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Gaskets.
Floor Flanges.
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Bibb Washers.
Bumpers.
Canadian Force Cups.
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Bulbs and Floats.
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C. I. Sheet Packing.
Red Star Sheet Packing.

Our facilities for prompt service are unequalled and our values are easily the best within reach. For further information write our nearest branch or direct to Head Office.

Canadian Consolidated Rubber Co. Limited

Head Office - - - Montreal

28 Service branches throughout Canada.



HEALTH AND WEALTH ASSURED

THAT all dusty homes and buildings are insanitary, goes without saying. Every particle of dust can be removed from every corner of the room by using a TUEC.

UNTIL every Sanitary Engineer fully realizes that dust means death to the inhaler of dust, they cannot rightly claim the title "Sanitary Engineers."

EVERY Tuec stationary cleaner means health for the user, and wealth for the sanitary engineer installing the equipment. It's easy money, sure.

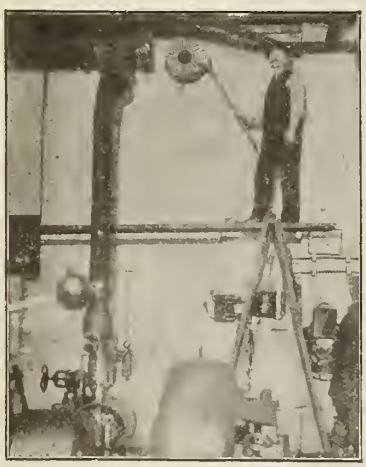
CANNOT you, Mr. Sanitary Engineer, give us the name and address of a possble user? We'll help to make the sale.

Write us at once for our proposition

United Electric Co., Limited

159 West Richmond Street - TORONTO

A "TOLEDO" at work in an awkward position.



A 6-inch pipe projecting only 10 inches through a brick wall, and 12 feet above the floor required to be threaded. It would have been a costly job to have taken it down to have the thread cut, but a "Toledo" No. 3 quickly did the job.

It took two men, only, to get the tool up on the pipe.

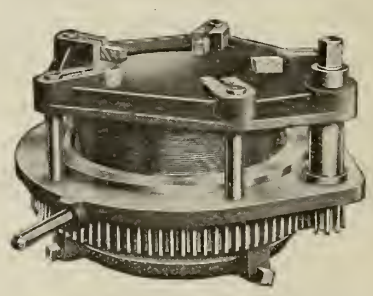
After it was up, one man easily cut the thread.

"Toledo" and "Jardine" Ratchet tools, work in any old corner.

They finish a thread at one cut, making as clean a job as if cut in a lathe.

They are made in Canada. One man does the work of two.

Write for catalog and full particulars.



A. B. JARDINE & CO.

HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.

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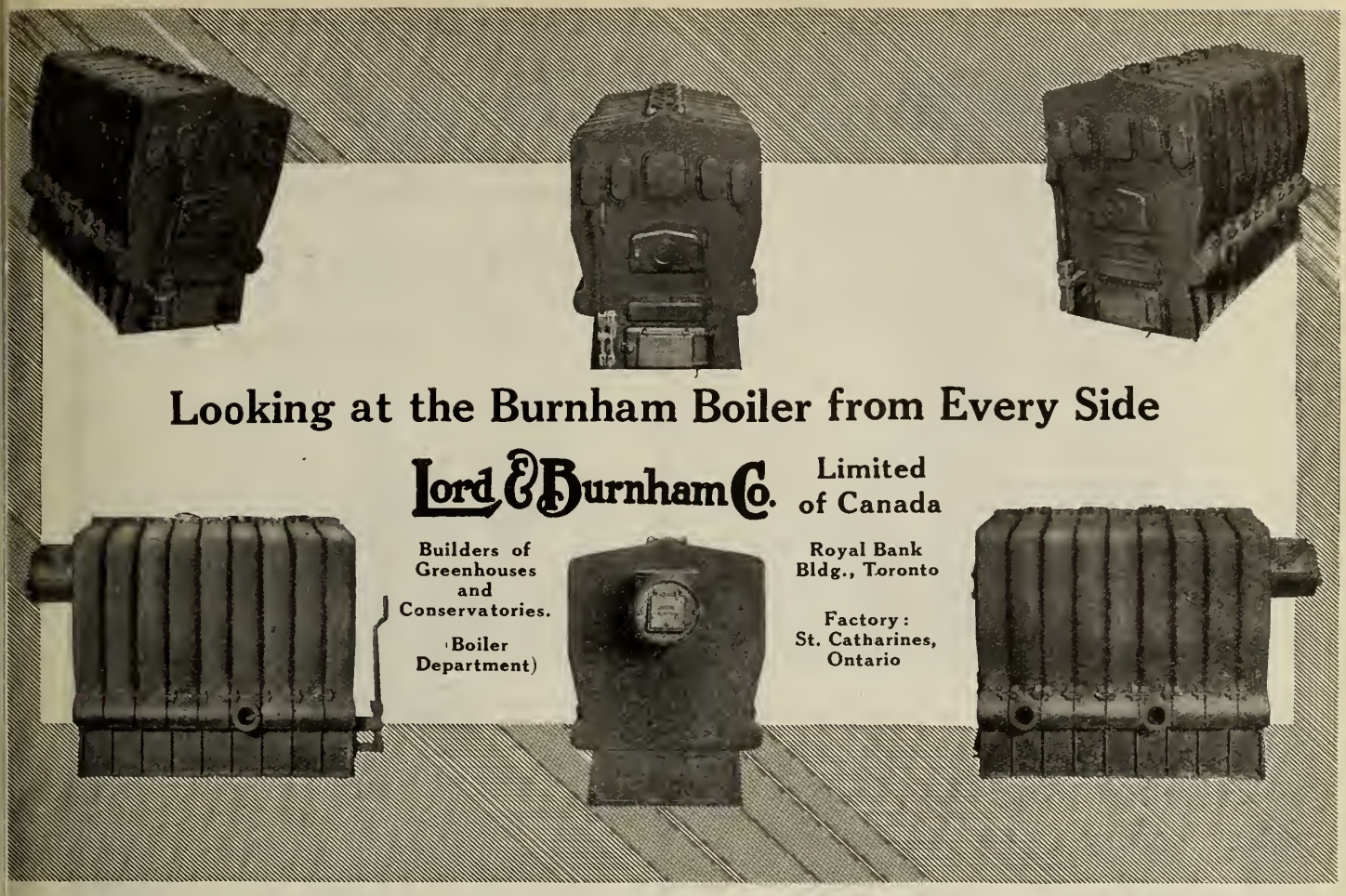
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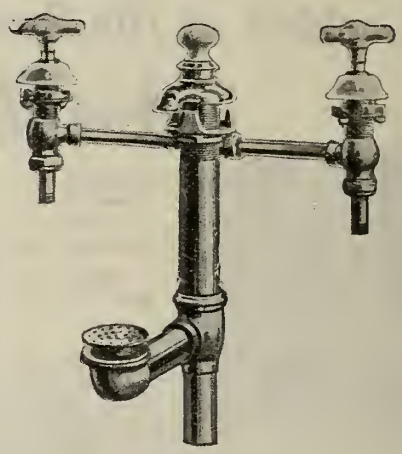
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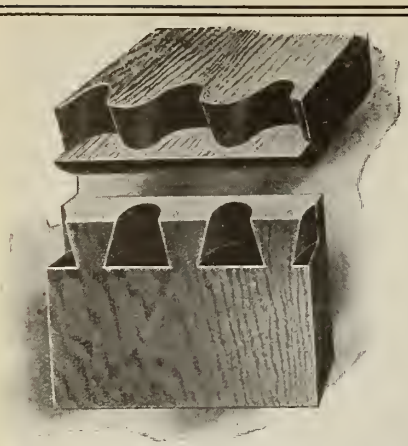
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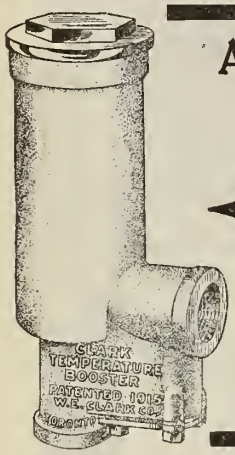
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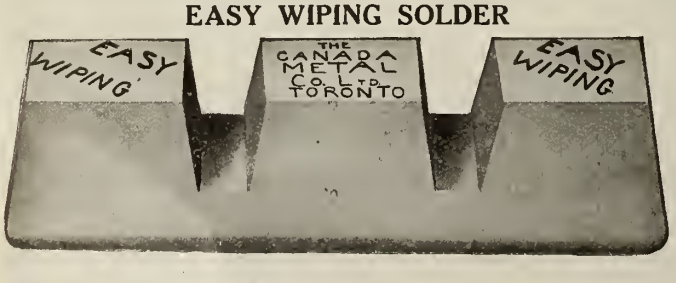
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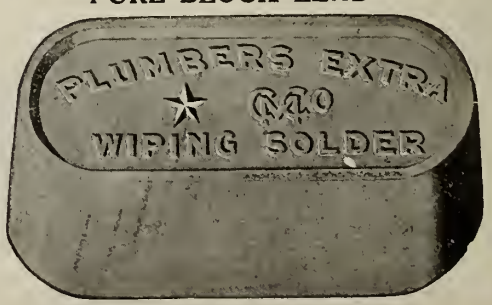
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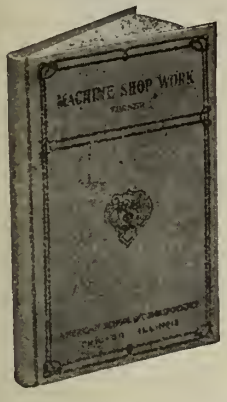
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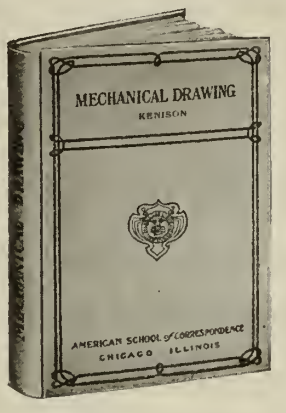
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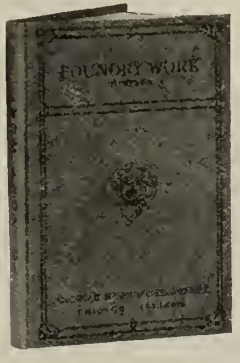
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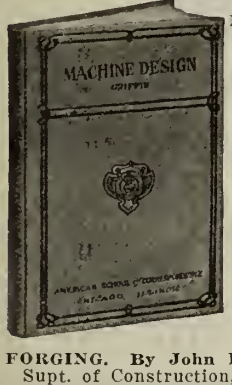
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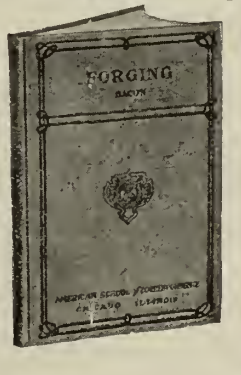
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SANITARY ENGINEER

PLUMBER AND STEAMFITTER OF CANADA

Official Organ of the Sanitary and Heating Trade

Vol. XI. TORONTO, JANUARY 15, 1917 No. 2

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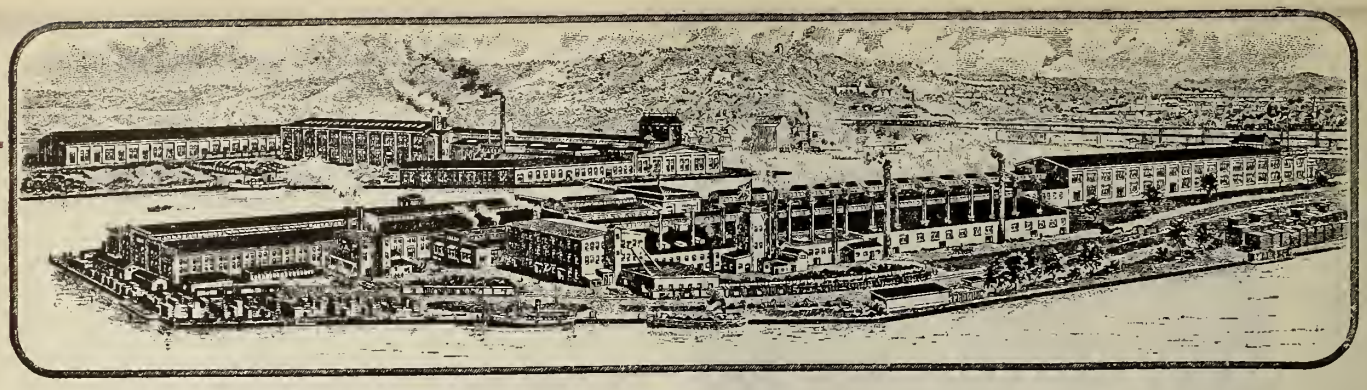
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THE SANITARY ENGINEER

VOL. XI JANUARY 15, 1917 No. 2

The Cost of Doing Business

Cost is Something Absolute, it Must be Paid in Some Form or Other and by Some One —The Person Starting in Business Should Never Lose Sight of the Cost of Doing Business, if He Wishes to Succeed.

BY ONE OF US.

ARTICLE 4

SOME time ago there appeared a number of articles in THE SANITARY ENGINEER deprecating the practice of furnishing estimates free. Why was this stand taken? Because it was found that at least 50 per cent. of the proprietor's time was spent furnishing estimates upon work he never got, the public taking it for granted that so long as they could procure such information free, they were only exercising their rights. Just think, reader, how much overhead expense could be dispensed with, were all the time thus spent charged for. The cost of doing business at least in a one to four-man business could be reduced from 10 to 25 per cent. By this is meant that from 10 to 25 cents on the dollar of the overhead expenses could be saved, and, in addition the rate of income would be greater.

But there are other ways in which money is lost, because money is lost if a business does not show a profit; and profit is that amount which is left on hand after every item of expense has been provided for.

Let us suppose, however, that the actual overhead expense is known, that the amount is 25 per cent. and that a profit of 10 per cent. is desired. What would be the proper way to figure such a problem out? Say time and material as charged for in time book and invoice amounts to $390. What would be the price to charge a customer. If the profit and O-H expenses amount to 35 per cent., the time and material must be 65 per cent., because as we proved in our previous article the selling price represents the full 100 per cent. always. It must do. It is the total transferred value for goods in time and material and is the sum which the business man has to do business on and leave a 10 per cent. margin of profit in this case.



Describing Proper Method.

Now, if $3.90 represents 65 per cent. of 100 per cent. the amount should be divided by 65, and 1 per cent. is the result, viz., 6 cents. Next multiply 25 per cent. by 6 cents, results $1.50. Now multiply 10 per cent. by 6=60 cents, and we find that $6.00 is the selling price, viz., the full 100 per cent.

It can clearly be seen that 25 per cent. overhead can be paid out, 65 per cent. for time and material and the de-

sired 10 per cent., viz., 60 cents is also assured.

Wrong Method

The method adopted by many is as follows: Goods cost $3.90. 25 per cent overhead 97½ cents, 10 per cent. desired profit 39 cents. Total $5.26½ These figures show a loss not only of all the profit but a part of the overhead nearly 2½ per cent.

A business conducted upon such a basis of figuring would result in a dead loss of nearly 2½ per cent. and no profit. To put it another way, the transaction under consideration, which proved the selling price to be $5.26½ resulted in a loss of a little over 12½ per cent.

A case in point, lately came before a court of law. A certain concern contracted to execute some work and supply time and material on a profit of so much profits over actual cost. It transpired that the concern added their overhead expenses as an item of cost, the customer refused to pay overhead expenses and took the matter to court.

The presiding Judge after hearing the details, allowed the contractor his overhead expenses and assured the plaintiff that overhead was a legal, and legitimate item of cost. Such decisions are only just, and to be just to oneself is only building a firm foundation for lasting businesss.

(Continued in next issue).

Why Many Fail in Business

Because They Figure Their Profits Incorrectly

THE RIGHT WAY

Example:

Expense of doing business is.. 25%
(Figured on Gross Sales, i.e., selling price.)
It is desired to make a profit of 10%
(Must be figured on selling price.)
Cost of an article is..... $2.00

Solution:

Selling price = Expense (Rent, Light, Heat, Wages, Advertising, Insurance, Freight, Express, Delivery Charges, Telephone, Int. on Capital Invested, Depreciation of Stock, Bad Debts, Extraordinary Expense.) + Profit + Cost

100% . . equals Selling Price
35% . . equals . Expense 25%, Profit 10%

65% (of selling price) equals . Cost
Divide $2.00 by .65 equals . $3.08

Answer:

Selling Price should be made $3.08

Proof:

Expense	25% of $3.08 equals	$ .77
Profit	10% of 3.08 equals	.31
Cost	65% of 3.08 equals	2.00

Selling Price 100% equals . $3.0.8
Figuring it as 25% plus 10%, or $2.70
which is less than Cost $2.00
plus Expense . .77 $2.77



GERMANS LOOK TOWARD AFTER-WAR ACTIVITIES

The semi-official Cologne Gazette states that at a recent meeting of the National League of Manufacturers the executive committee defined German's principal after-the-war needs, from an industrial standpoint, as "increased armaments and an improvement in the journalistic service on behalf of our export interests." When Dr. Harmann recently retired from the directorship of the Berlin Press Bureau his chief confidant, Herr August Stein, Berlin correspondent of The Frankfurter Zeitung, stated that Hermann would bequeath to his successor a comprehensive scheme for influencing the world's press in German interests.

This is not the first time by any means that German manufacturers have planned to get the sympathetic ear of technical editors and journalists and those that are subscribers to trade papers need to be ever on the lookout for reading notices, and trade news relating to the application of machinery for various purposes.

If our highest authorities in technical matters would look round, they will find that in mechanical art, sciences and almost anything appertaining to industrial progress, the German people have not been originators, they have copied the germ of science from other nations and have exploited these sciences. They are not originators, but rather copyists and exploiters.

Central Heating and Power Plant, University of Toronto

By L. M. Arkley, M. Can. Soc, C.E.

The operation of central heating plants for the supply and distribution of heat over comparatively large areas has been successfully accomplished in certain instances by progressive municipalities. The private installation of such systems, however, is somewhat infrequent, due probably to absence of opportunity. Such an enterprise as that featured in the present article possesses exceptional interest not only because of magnitude and distances involved, but because of the consistent results which are justifying the wisdom of the undertaking.

THE auxiliary apparatus in the engine room is illustrated in Fig. 13. At the left of the photograph is a Webster open type feed water heater, which receives part of the exhaust steam from the generating units, and is supplied with feed water by two Smart-Turner 6 in. x 5¾ in. x 6 in. duplex pumps, located next to it. Further to the right is a Kennicott water weigher with a maximum capacity of 65,000 lbs. per hr. Immediately above the water weigher is the entrance to the tunnel which carries the distributing pipes and cables referred to later, the 20 in. main being clearly discernible as it enters. At the extreme right is an 8-in. x 12-in. x 12-in. Warren vacuum pump, referred to above.

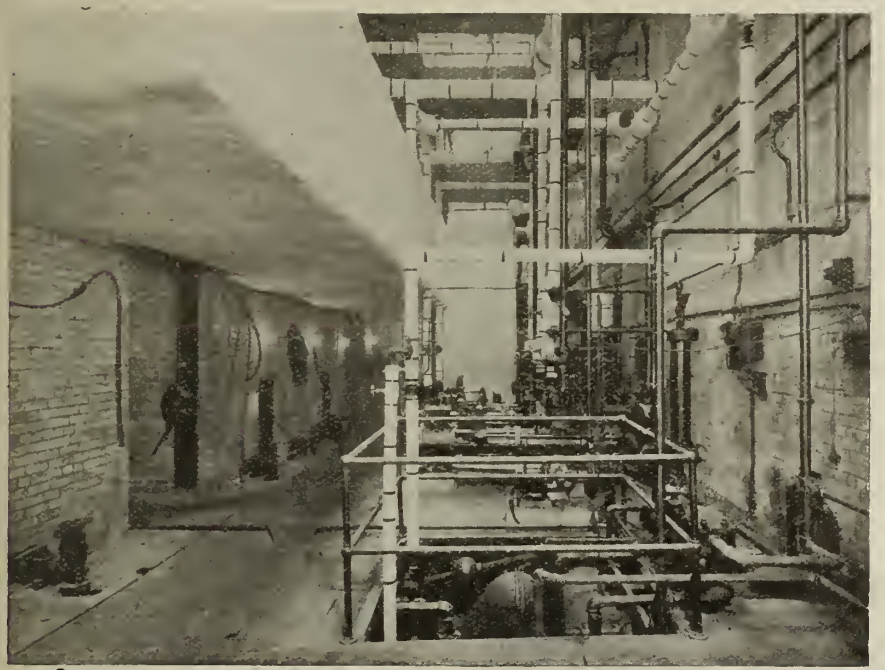


FIG. 10—PUMP ROOM SHOWING ALSO SMOKE BREECHING IN UPPER LEFT HAND CORNER AND FAN CASINGS IN BACKGROUND. HOT WELL IS IN IMMEDIATE FOREGROUND

Heating System

The heating system was originally designed as a gravity return system, the hot well in the power house being the low point to which all condensed steam returned by gravity. Of the original buildings heated in this way, the Main and Mining Buildings have been changed to a vacuum system and the same method has been adopted for the recently completed Knox College and for Hart House. In this case the vacuum pumps located in these buildings discharge the returns from the radiation to overhead tanks, from which it flows by gravity into the main return line back to the power house.

The following table gives a list of the buildings heated, together with the number of square feet of radiation in each for the heating season 1914-15:—

Name and No. of Building.	No. of sq. ft. of Radiation.
No. 1—Main	12,936
No. 2—Hart House (in course of construction)	5,000
No. 3—Library	10,829
No. 4—Medical	7,160
No. 5—Biological	8,271
No. 6—Engineering	9,084
No. 7—Thermodynamics	6,114
No. 8—Observatory	783
No. 9—Mining	12,721
No. 10—Chemical	6,595
No. 11—Physics	19,648
No. 12—Convocation Hall	6,689
No. 13—Men's Residences	9,336
No. 14—Household Science	10,137
No. 15—Museum	17,303
No. 16—Wycliffe College	12,371
No. 17—Victoria College	9,028
No. 18—Victoria College (Library).	4,021

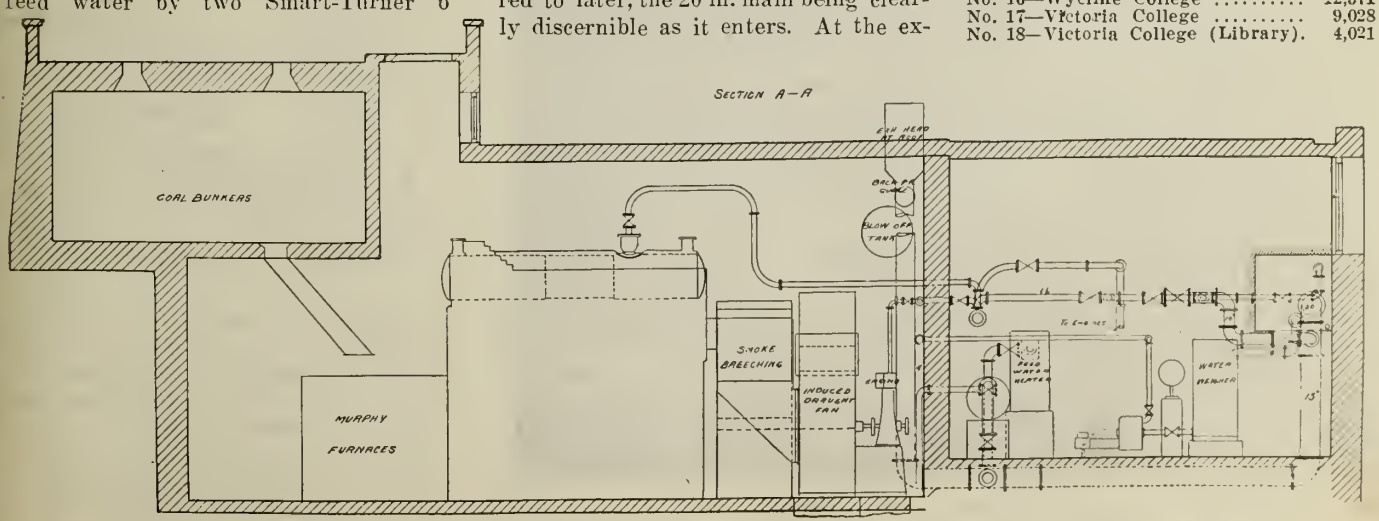


FIG. 7—SECTION OF POWER HOUSE BUILDING SHOWING ELEVATIONS OF THE VARIOUS UNITS OF EQUIPMENT

No. 19—Annesley Hall	4,274
No. 20—Burwash Hall	4,300
No. 21—Knox College (not completed	15,000
Total sq. ft. of radiation.....	196,534

Note:—No allowance made for indirect radiation.

Piping Distribution System

The main heating pipe as it leaves the power house is 20 in. dia., and continues of this size to a point west of the Medical Building (4), where it branches north and south in 16 in. mains, and gradually reduces in size towards the end of the line.

All engines, turbines and steam pumps in the power house exhaust into this pipe, but as the lighting and power load is normally small compared with the heating load required, live steam is introduced by passing it through a pressure reducing valve in the usual way. A pressure of from one to 4 lbs. per sq. in. is carried on the main heating pipe at the power house.

The question of expansion and contraction due to change in temperature is an important one in a steam line of this length, and it is taken care of by slip expansion joints, the pipe being securely anchored at the proper points. This form of expansion gives satisfactory service if the pipe is looked after and kept well in line, otherwise it leaks.

A question of still greater importance than that of expansion is that of condensation of steam, as excessive condensation means not only a loss of heat, but also introduces the problem of taking care of the water of condensation. The best method of reducing the loss from this source is, of course, to lag the pipes well with some heat insulating material; this feature in the original layout was somewhat neglected resulting in a hot tunnel and large quantities of condensed steam in the main pipe, this condensation being drained from the pipe through traps to the power house. It was found necessary later to instal a vacuum pump in the power house to pump this condensation back and deliver it to the hot well, and with this addition the system works quite satisfactorily.

Besides the main heating pipe, the tunnel contains a live steam main of 5 in. diameter, where it leaves the power house, also the main gravity return line of 8 in. diameter, and a 3 in. return line to the vacuum pump from the 20-in. main. The live steam is carried at 50 lbs. pressure and is used principally in the Main Building (1), Burwash Hall (20), Knox College (21), and the Household Science Building (14).

Besides these pipes all electric wires are carried on the walls of the tunnel.

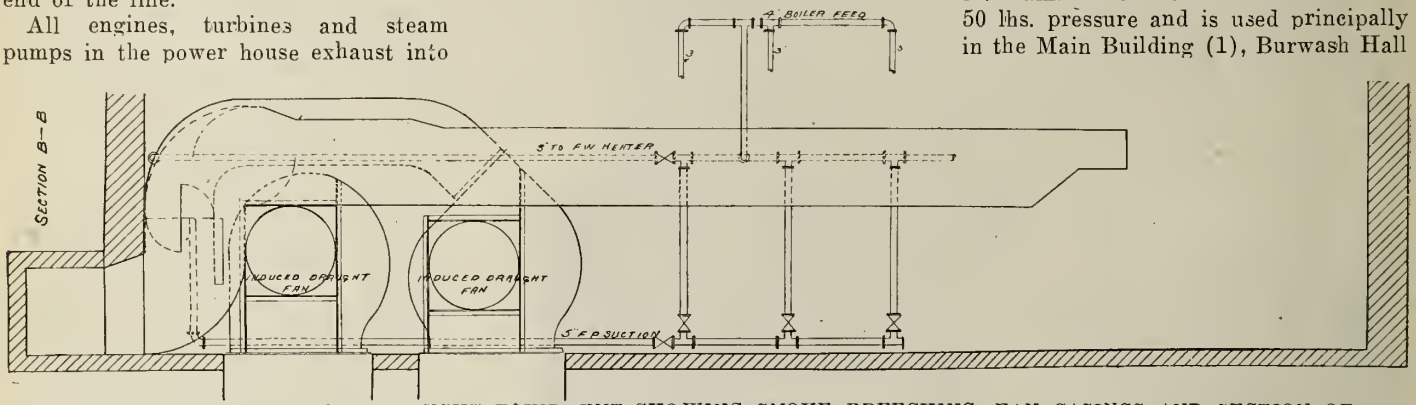


FIG. 8—ELEVATION OF INDUCED DRAUGHT EQUIPMENT SHOWING SMOKE BREECHING, FAN CASINGS AND SECTION OF SMOKE TUNNEL

Tunnel Construction

The main tunnel through which all steam pipes and electric wires are distributed to the various buildings, is of concrete and of 5 ft. x 6 ft., inside dimensions, where it leaves the power house. Its walls are vertical and 8 in. thick, while the roof slab slopes from 9 in. at the centre to 6 in. at the walls, and is reinforced where necessary.

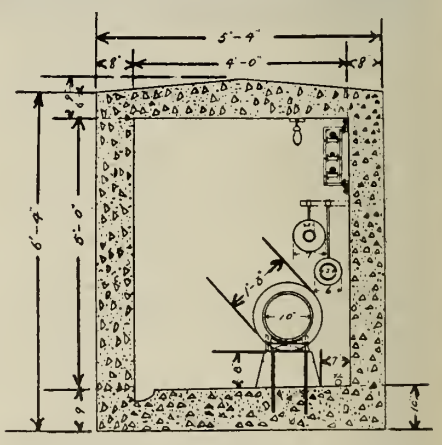


FIG. 14—SECTION OF TUNNEL CONNECTING KNOX COLLEGE WITH CONVOCATION HALL

The power house is indicated on Fig. 5 by a solid black circle.

Figure 14 shows a section of a piece of tunnel built recently by the Superintendent's Department to connect Knox

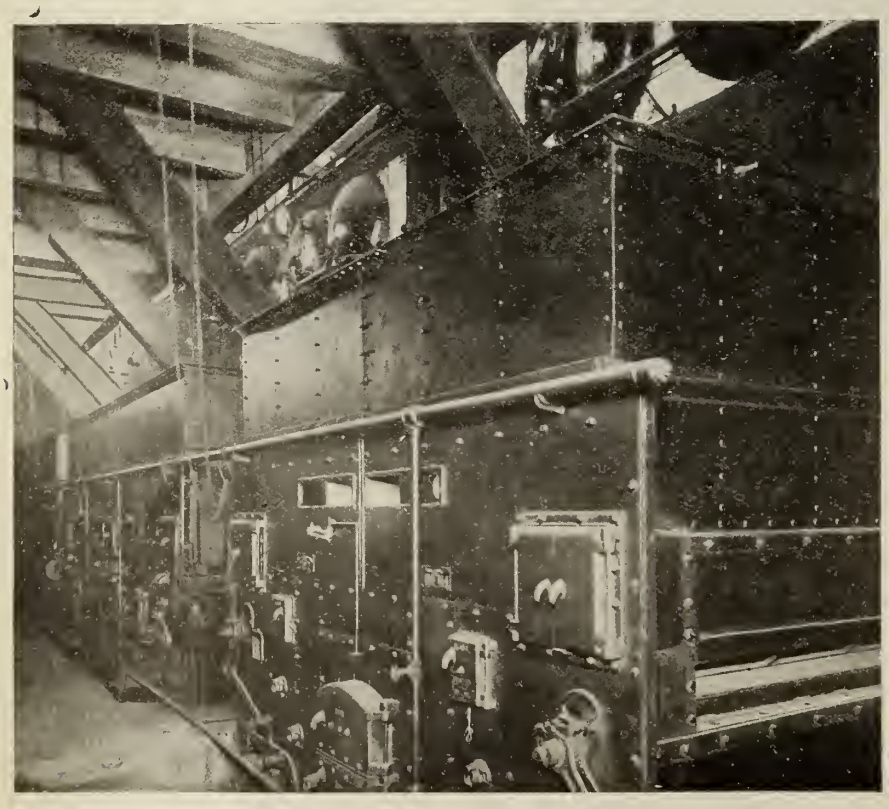


FIG. 9.—BOILER ROOM SHOWING MURPHY FURNACE INSTALLATION.

College (21) with Convocation Hall (12). This shows a considerable improvement over the first tunnel built, in the arrangement of the piping and which in turn are supported by subwhich in turn ares upported by substantial concrete piers securely bolted at the bottom of the tunnel; this point requires attention or the gradual movement of the pipe due to expansion, will work the piers loose in a short time, this trouble having actually developed in the original layout. The plant has been remodeled in many respects since first installed and this work has been done under the supervision of A. D. LePan, Joint Superintendent of Buildings and Grounds, under whose direct supervision the plant is operated.

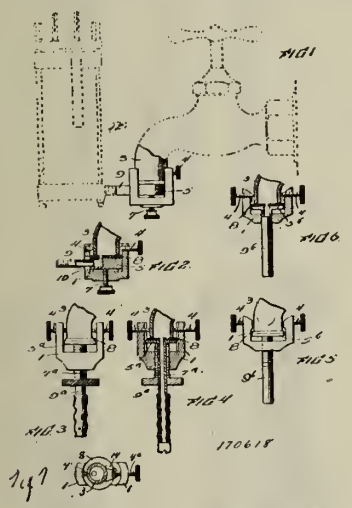
(Continued in next issue).

New Canadian Patents

No. 170,618.

Milton H. Shoenberg, San Francisco, California, U.S.A., 4th July, 1916; 6 years. Filed 15th May, 1916. Receipt No. 265,542.

Claim.—1. A clamping device which may be readily detached from a faucet or other outlet tube or pipe, characterized by the fact that the yoke frame which embraces the end of the faucet or



170,618. Clamp for Faucets.

pipe and carries the gasketed connecting member is first attached to the faucet or pipe and the connecting member is then adjusted within the yoke against the pipe end so that a tight joint may be effected, and the discharge end of the connecting member passes through an aperture in the yoke by which it is guided and held against lateral displacement.

2. A faucet or pipe clamping attachment comprising a support adapted to embrace the outlet end of a faucet or pipe, adjustable securing devices carried by said support to engage said outlet end, an outlet connecting member having a stem passing through an aperture in said support and guided therein, and means for adjusting said connecting member toward or away from said outlet end of the faucet or pipe.

3. A faucet or pipe clamping attachment comprising a support adapted to embrace the outlet end of a faucet or pipe, adjustable securing devices carried by said support to engage said outlet end, an outlet connecting member having a stem passing through an aperture in said support to engage said outlet end, an outlet connecting member having a stem passing through an aperture in said support and guided therein, means threaded in said aperture for adjusting said connecting member toward or away from said outlet end of the faucet or pipe, and means interposed between said outlet connecting member and the end of the pipe or faucet for effecting a tight joint.

4. A faucet or pipe clamping attachment, comprising a yoke support adapted to embrace the outlet end of a faucet or pipe, means carried by the yoke arms for detachably securing the support to said outlet end, a fluid outlet connection adjustably mounted between said yoke arms and having a discharge stem passing through an aperture in said yoke and guided therein, and means for adjusting said outlet connection toward or from the end of the faucet or pipe.

5. A faucet or pipe clamping attachment as shown.

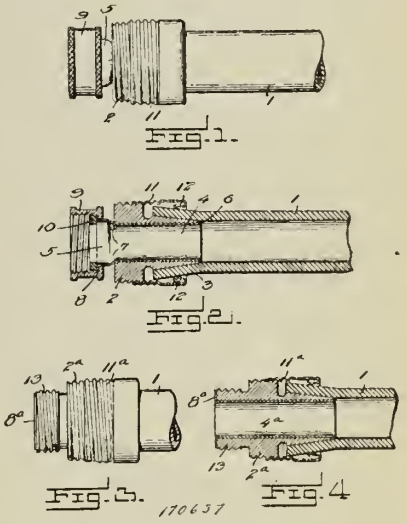
No. 170,637.

George J. Winter, Buffalo, New York, U.S.A., 4th July, 1916; 6 years. Filed 28th April, 1916. Receipt No. 264,831.

Claim.—1. A hose coupling comprising a body formed of material that is light in weight and is not liable to corrode, and having a longitudinal bore, and also having a rear portion for arrangement in the end of a hose, means for securing hose on said rear portion of the body, and a bushing snugly fitting in the bore of the body and having a rear flange opposed to and covering the rear end of the body, and also having a forward portion opposed to the forward end of the body and between which and the rear flange the body is snugly held, said forward portion being also constructed and arranged to isolate the forward end of the body from liquid passing through the bushing.

2. A hose coupling comprising a tubular body, and a bushing arranged longitudinally in said body, and having a rear flange opposed to the rear end of the body and also having a portion of increased diameter opposed to the forward end of the body and projecting forwardly from said end.

3. In a hose coupling, the combination of a tubular body having a longitudinal



No. 170.637. Hose Coupling.

bore, a bushing arranged in the bore of the body and having a rear flange that covers the rear end of the body, and a forward portion of increased diameter disposed in front of the body and carrying lugs arranged in seats in the body and also carrying a forward flange, and a swivel member mounted and retained on the forward portion of the bushing back of the flange thereof.

PACKAGES MARKED "FRAGILE" SHIPPERS should appreciate that it is quite useless to mark in English only, such expressions as "handle with care," "this side up," etc., on packages intended for foreign countries where English is not spoken or understood by those who will handle the freight. If any such instructions are necessary, they should be stated in the language of the country for which they are destined, as well as in English.

New Sanitary and Heating Goods

NORMALAIR HUMIDIFIERS

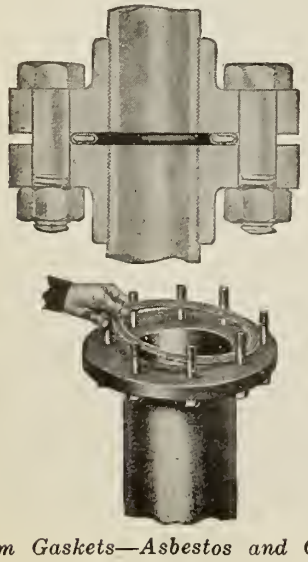
No class of engineers should denote more attention to the problem of humidity than should sanitary and heating engineers, for the simple reason that lack of humidity is not a healthy condition.

No home should be built or appliance installed therein unless some provisions are made to supply a uniform humidity. It is these conditions which lend themselves to causing all manner of bronchial and respiratory troubles.

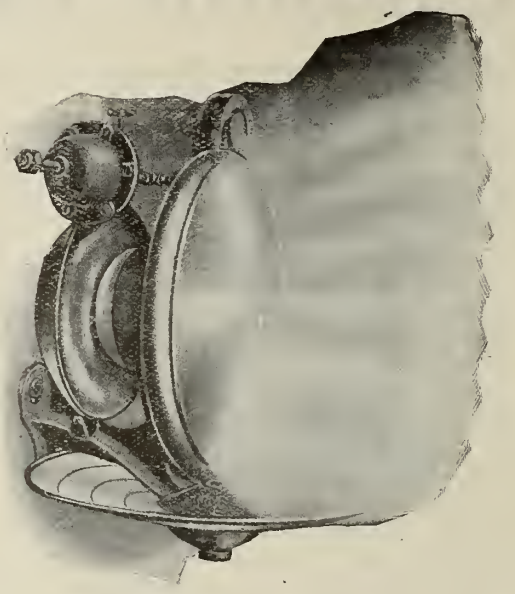
Humidity is also very essential in many industries. Bakers, spinners, weavers, tobacco manufacturers need some appliances installed in their buildings that will furnish a constant degree of humidity. It would, therefore, be to the advantage of every sanitary and heating engineer in Canada to interest himself in the sale and installation of such a specialty as is now being introduced on the market under the name of "Normalair Humidifier," manufactured by the Normalair Company, Winston-salem, North Carolina, whose northern agents are Dicks, Slosson Co., Inc., 302 Broadway, New York. Some very interesting literature may be procured free upon application to the above named firm.

NEW GASKETS

"It is the little things that count," is a true saying in almost every line of business; little leaks soon become big leaks. The wise buyer is not always the one who thinks of first cost. It is he that can see all down the line, view the possibilities of certain costly emergencies that may result if cheap, low price goods are procured. Most sanitary and heating engineers have used almost any old thing for washers and at what ultimate cost?



McKim Gaskets—Asbestos and Copper.



Normalair Humidifier.

One of the latest washers or gaskets to be put on the Canadian market for sanitary and heating engineers, as well as for all other users of gaskets, is the McKim gasket. It is being manufactured by the McCord Manufacturing Co., Detroit, with Canadian offices at Toronto. Further particulars may be procured from W. A. Buchanan, sales manager, Traders' Bank Building, Toronto.

FLOTA-MICA COMPOUND

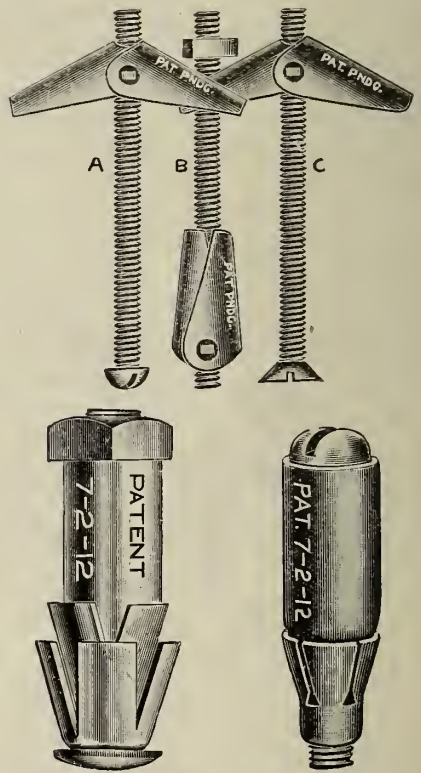
The latest pipe compound to be put on the market in Canada is being sold by W. A. Buchanan. The Flota Mica Sales Co., Traders Bank Building, Toronto. It is a very fine powder, is very light in weight, easily mixes with oil to the necessary consistency and is guaranteed to be a very efficient compound. superior to lead or paint. It is claimed that while making threaded joints tight, it will not harden, can be used in many ways and preserves gaskets, making it possible to remove them without destroying the gaskets.

NEW EXPANSION BOLTS.

About the handiest convenience in a workman's kit is a supply of expansion bolts and when fixtures are to be fitted up to either walls or ceilinge these specialties fill a long felt want.

No up-to-date sanitary and heating engineer would be seen using wooden plugs these days.

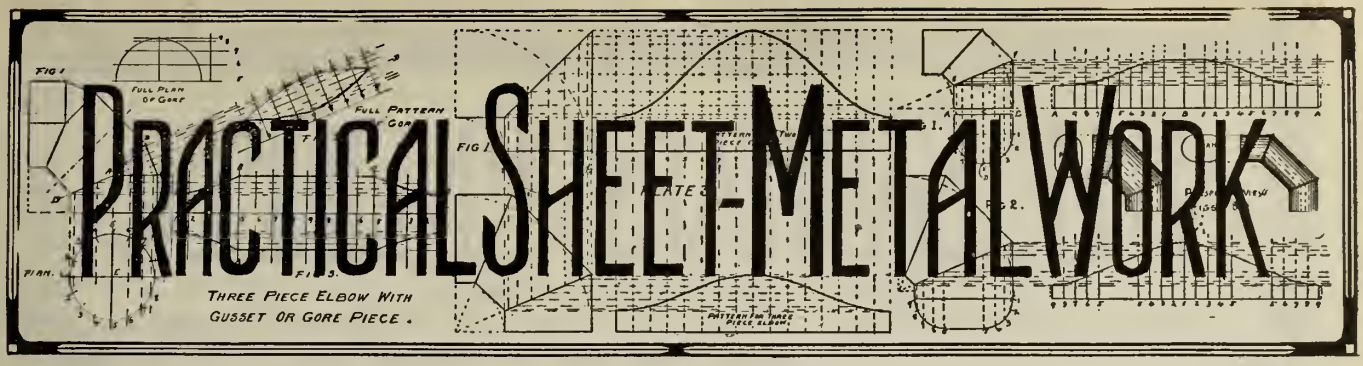
The Paine Co., 802 Marquette Bldgs., Chicago, are placing a line of expansion bolts on the market which can be used in many ways. Some very novel claims are made for them, and judging by their appearance they seem to be a reliable line. The Canadian distributors are R. E. T. Pringle, Ltd., Tyrrell Bldgs., King E., Toronto.



The Paine line of expansion and tagle bolts.

WHAT MAKES HER STOP?

Gents:—The gas engine you sent me stops when theres nothing the matter with it thats the trouble. It wouldn't bee so bad if it stopped for some reason and anybody knows theres reasons enough for it to stop. I received the book which you sent me which is named "What Makes the Gasoline Engine Go." I can't read it because whats the use reading it when I don't care what makes her go as long as she goes which mine don't only occasionally, what I want to know is What Makes the Gasoline Engine Stop. If you got a book called that send me one. I want to know what makes her stop when everything is o k and nothing is the matter except that it is a rotten engine.



BY THOMAS STANFIELD

Article 7.

TO the sheet metal worker of a few years' experience there are many ways, short cuts, etc., by which certain fittings may be made without actually developing a pattern, but all such wrinkles must needs be obtained by long experience. The making of a T-piece, such as described in Fig. 1, can be cut from two pieces of pipe, and many a man who could make a T in the way mentioned may not even be able to lay out a pattern for this same fitting.

To develop such a pattern, first determine the diameter, the length of pipe and T branch, and draw an elevation as shown at A B C D E F G H J.

Next draw a plan. In this case only the plan is shown of the pipe and full plan of the branch.

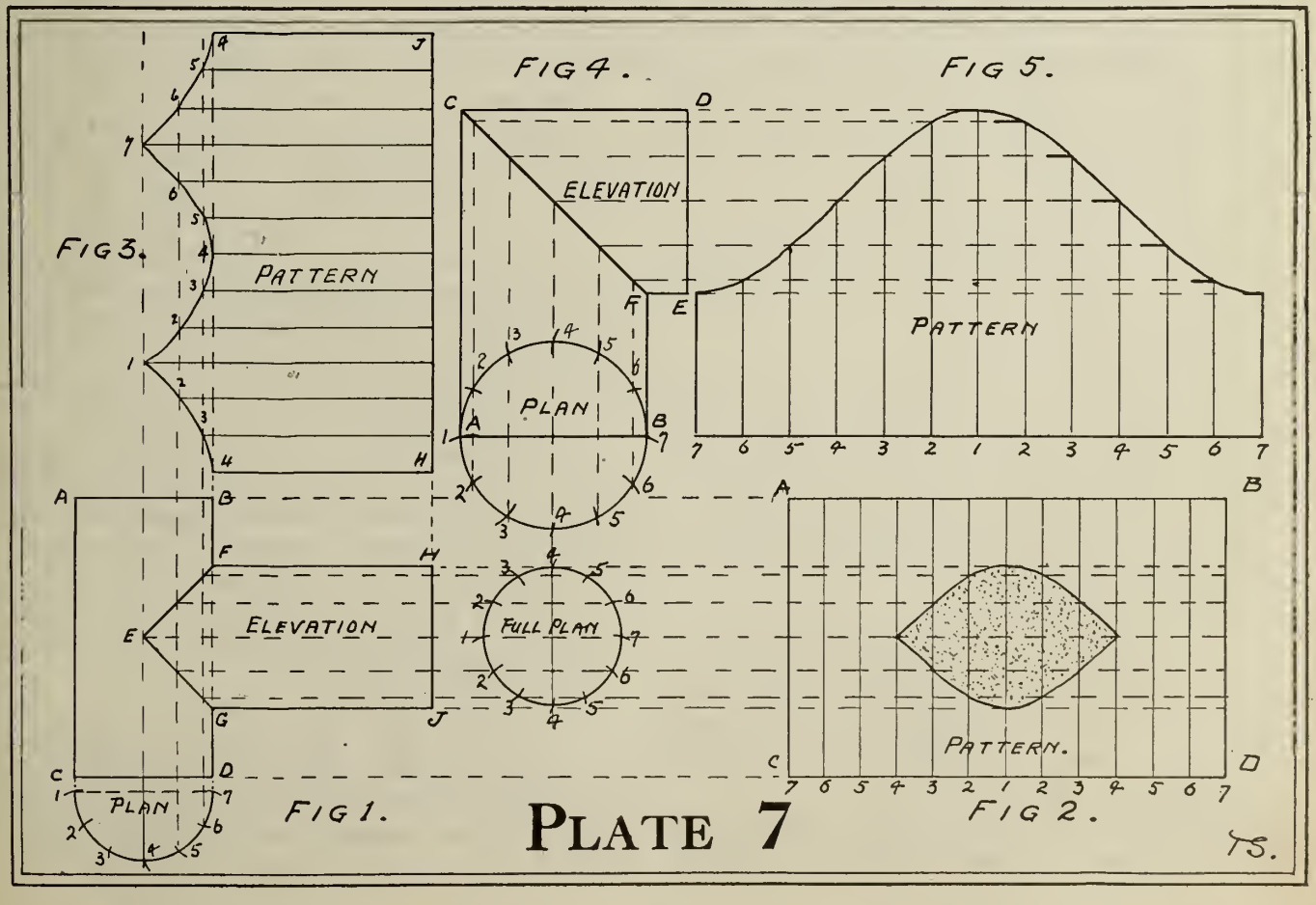
Divide the half plan into an equal number of parts, as shown, 1, 2, 3, 4, 5, 6, 7. Then from 4, 5, 6 draw perpendicular lines until the mitre lines E F G are intersected.

Now extend lines A B and C D horizontally to any convenient distance, until the two stretchout lines are drawn, and transfer the measurements on plan to line C D on stretchout line, Fig. 2, beginning in the centre of the stretchout line with 1, 2, 3, etc., to 7 to the right and left respectively. Next draw a number of perpendicular lines from these figures mentioned, until all are completed, as described in Fig. 2. A B C D in Fig. 2 represents the amount of sheet metal required. The opening for the branch must now be developed.

From the mitres E F G, in Fig. 1, draw dotted lines from each point of intersection until the full plan has been cut, as well as all the perpendicular lines shown in Fig. 2. The points where these horizontal lines cut the perpendicular lines require to be connected, as shown by the solid curved lines. The shaded portion describes the pattern of the opening.

To develop the pattern for the branch, Fig. 3, another stretchout line is first drawn by extending line H J and also the dotted lines which cut the mitre line E F. Next transfer the stretchout measurements to line H J, Fig. 3, in the same manner as in Fig. 2, 1, 2, 3, 4, 5, 6, 7, etc., and from these measurements draw a number of lines parallel to each other, cutting the perpendicular lines as vari-

(Continued on page 27).



THE SANITARY ENGINEER

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Circulating amongst Sanitary, Heating and Ventilating Engineers, Gas Fitters, Sanitary Inspectors, City Engineers, Boards of Health, Architects, etc.

JANUARY 15, 1917

ENCOURAGING NEWS

SOMETIME ago in Montreal, a firm of sanitary and heating engineers were asked to estimate on certain work. Upon looking the work over it was found to be so very complex that to quote a safe price the tenderer would require to charge for a number of possible emergencies that might or might not materialize.

It was, however, decided that the work be done at cost plus so much profit.

The work was done satisfactorily and a settlement was to be made. But before so doing the customer asked for the invoices, vouchers and time checks. These were all furnished and a certain per cent. added for overhead expenses, plus the profit agreed upon. The customer refused to pay the amount of overhead expenses, and an appeal to the Court was made by the contractor.

His Worship Judge Greenshields presided, and in summing up the case declared the overhead expenses are a legal charge and an item of cost, just as essential as either wages or material. These overhead expenses were awarded by the Judge.

Now, what are we to learn from this decision? Two things at least. First, that it is very right, proper and legal to charge and provide in our charges, a certain amount to meet the cost of doing business. Second, if it is legal so to do, and the law is so being defined, then it is surely the height of folly to conduct a business unless such overhead expenses are provided for.

The more one studies the question the more convincing it appears that a business training is eminently essential to every one who anticipates establishing a business. It is encouraging to find that the law of the land is in sympathy with the stand that overhead expenses must be charged.

How many sanitary and heating engineers are there to-day that have been the innocent or ignorant victims of their omission to charge them? In this connection it would not be out of place to voice the hope, that the day is not far distant, when a person found conducting his business at a loss, shall be held to account for his losses. Such legislation would be most humanely beneficial for all concerned. It would not be a hardship, but rather would it prevent thousands of business failures, encourage more study in business management and save many a person from financial worry.

WORKMAN'S COMPENSATION

IT seems somehow, that the management of this old world of ours is anything but consistent.

Here are a few every-day thoughts:—when a person is sick, his or her pay is stopped, just at a time when one needs more pay in actual fact. The same if one is ill and calls a doctor in, the doctor quite naturally has to be paid, why? because he has rendered service to the sick. But why sick? Well, either accidents, or some disease is contracted and there is sickness, or one is incapacitated. But why? Accidents, 90 per cent. at least are preventable, and at least 75 per cent. of the ills that the human race is heir to, are preventable.

It is said that in China, the medical man receives a certain payment from his client, just so long as that client is in good health. And the moment he or she is taken sick the payments cease until the patient is properly recovered. This would appear to be sound logic, and there are many ways of arriving at the same results by preparing for sickness, not, of course, anticipating that period.

This subject was discussed at some length recently in Toronto and certain persons voiced the idea that the employer be held liable for the doctor's bill. Others contended that the patient should pay, while both parties were unanimous as to the doctor's right to receive proper payment for service rendered.

Now to all sane-minded men, men who do not try to mislead themselves, it would appear to be the most logical way to include in the compensation charges sufficient funds to cover the doctor's fee. It would also ensure him payment of his account more promptly than under the present arrangement, and THE SANITARY ENGINEER has no hesitation in saying that such a method would work out to the mutual benefit of all, once it be put into operation.

As a whole those persons who took exception to the Ontario Workmen's Compensation Act being put into force are to-day in strict accordance with it, after having seen how it works out.

Pay the doctor his bill, and pay it promptly. This cannot be done under the present state of affairs, sanitary and heating engineers are almost in the same class regarding long winded, outstanding accounts, and therefore know from experience what it means.

FIGURING COST

THE series of articles appearing in The Sanitary Engineer, on "Cost of doing business, is proving of great interest, judging by the comment being expressed by our readers. The blackboard talks, which appear in this issue, should prove doubly so.

We also publish in the Question Box a problem in connection with a rather interesting side to it.

One reader of THE SANITARY ENGINEER stated that "any reader who made a failure in his business after having access to such useful information, should certainly be looked upon as unfit to rank as a business man." However, be that as it may, we hope to further prove that it costs more to do business, be the enterprise ever so small, and it is simply a matter of "counting the cost" a little ahead, rather than plunging into business in a slip shod way.

If any reader has a problem in connection with his bookkeeping collections, or legal matters, we will be only too pleased to help all we can. It is mainly with a view of better preparing for the good times to come that we are taking such subjects up at this time. We wish to show every one of our readers how to "stop the leaks" before it is too late. One cannot help remarking how few sanitary and heating engineers there are that can safely say they are "well off" in spite of the fact that many have labored their whole life in the profession.

A SPLENDID MOVEMENT

"THE BONNE ENTENTE"

SPACE does not permit to re-print the report of the doings of "The Bonne Entente," which came to hand a few days ago. It makes very interesting reading indeed.

The Bonne Entente came into being some time during last summer, 1916, and from time to time several meetings were held and a very earnest committee appointed to represent Ontario.

In August last this committee held a meeting in Montreal with a similar committee representing four Quebec cities. That meeting definitely decided upon a tour of the following cities: Montreal, Quebec, Sherbrooke and Three Rivers, and after a frank and friendly discussion of the racial situation, the following resolution was passed unanimously:—

"We, French and English-speaking Canadians, in conference assembled for the promotion of National Unity, having established, by friendly intercourse, a mutual respect and a firm conviction in the innate fair-mindedness of the vast majority of both races, do hereby place ourselves on record as of the unalterable belief that there is not now, nor ever will be in the future, any issue between the two races in Canada which cannot, and, of right, should not be amicably and equitably settled, and in such a manner as to give satisfaction to the great majority of all concerned."

The tour to the afore-named cities proved to be an astounding success. Some of the finest, clean-cut men became interested and to-day "The Bonne Entente" is a real live movement representing the most brotherly sentiment to be found in the two provinces.

The maritime provinces and Manitoba sent delegates to the various meetings.

At the Sherbrooke banquet the following resolution was unanimously passed:—

"That Sir George Garneau and Mr. John M. Godfrey be requested to appoint a committee to make arrangements for the return visit to Ontario, and for a permanent organization to promote racial good-will along lines of interchange of public speaking on topics of common concern, the dissemination of printed matter, and the spread of inter-provincial information through educative institutions."

At the Montreal meeting Ontario extended an invitation for a return visit to take place on January 8th, 9th, and 10th, which was accepted. It was felt that it was best to proceed without immediately making a rigid or elaborate organization, the spontaneous development which had occurred from the beginning offering the surest promise of a continuing motive force of racial good-will and national unity.

At the time of writing the above committee is engaged in carrying out the programme, and from all accounts the tour is proving a great success. There can be no doubt as to the outcome of such a splendid movement. The spirit that calls out in clarion tones, "Come let us reason together," is bound to succeed.

Practical Sanitary Engineering

The First Course of Its Kind Ever Published in Canada—Specially Prepared for the Craft Coming Up, as Well as Those Who in These Days Construct Work Simply Because the "By-law Says So"

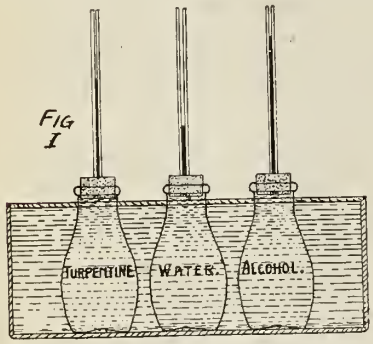
BY THE EDITOR.

ARTICLE II.

Practical Science.

THE first and foremost studies necessary to the coming sanitary engineer, are those of substances.

Substances are of various forms, and are divided into at least three classes—solids, liquids and gases. There are thousands of solids which come under as many classes, the same with liquids, as well as gases. All substances have some affinity to some other substances. Our whole industrial progress is built up on various combinations and the application of these combinations. Substances that can be combined are constructive, or useful in many ways. Other substances there are that in combination with others are of a destructive nature, and even these are at times applied to the benefit of humanity.



Solids

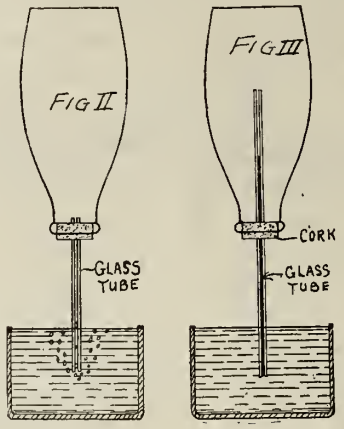
A solid is a substance which is of definite form, size or shape; it requires some physical force to change its shape, size, or nature; for instance, copper, lead, wood.

Liquids

A liquid is a substance that has no definite shape; it is fluid, and will follow the interior form of any shape of vessel; its particles can be separated easily, and many fluids can be evaporated, just as some solids can be dissolved.

Gases

The air we breathe is a form of gas. All gases are devoid of definite size or shape, and always fill the vessels which contain them. We are apt to say, "this bottle is empty." In actual fact, there never was such a thing as an empty bottle.



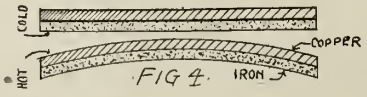
Physical Changes

Solids can be changed in form, in chemical as well as in physical nature, by the application of heat or cold. The application of heat to iron up to a certain degree will merely change its size; it will expand. Further heat will make all iron more or less malleable; still a higher temperature will cause iron, as well as all other metals to become fluid. Some metals expand more than others, and many metals do not retain their original size or bulk when cooled. Some change more than others. For instance, antimony if merely heated to fluidity will neither expand nor contract; it remains the same in bulk, or nearly so, and weight. But, like most other metals, if heated to too high a temperature, it becomes volatile, and loses certain properties in the form of gases, thus decreasing its weight.

Antimony is a very valuable metal in the electrotyping industry, because duplicates can be made from an original piece of type or typed matter, zinc etchings, copper plates, etc.

Heat and Cold

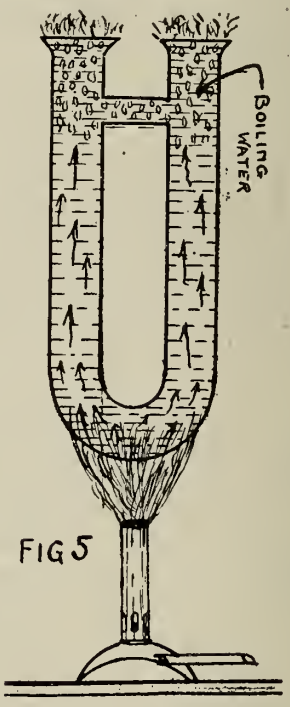
We say that an article is hot, or it is cold. What do we mean by this? Simply that one body has been in contact



with some other body of a higher temperature, and the former has been a means of taking some of the heat from the latter.

If we place a bar of metal in a fire, it will absorb some of the heat from the fire and we realize that the iron is hot by touching it. Wax can be melted, paper can be scorched, water can be evaporated, according to the heat of the metal.

A copper soldering bit, if tinned, will melt solder, tin, bismuth, and many other metals that will melt at a lower temperature than the head of the soldering bit. Metals can also be heated by friction,



drilling a hole, or rubbing together. Wood can be burned, set on fire by friction. The savages to-day in many foreign lands can set fires going by friction. Many of our forest fires are said to have been started by the branches rubbing one against another.

These latter illustrations are said to have given birth to the term that heat is a form of energy, and so it is with certain chemicals and solids. Take a vessel containing sulphuric acid; add water to it and the combined fluids become hot, and will throw off a hot gas. This is because there is set up some energy between the molecules of the acid and the water; some authorities have termed this "chemical friction." The electric dynamo is sometimes used as an illustration when one asks what electricity is. The reply may be that electricity is a form of energy set up by metal friction. All electric generating stations

have to be well ventilated and kept reasonably cool if a maximum amount of current is to be developed. Water can be boiled without flame or fire in various ways, further illustrating how heat is a form of energy.

Suppose two metals were to be rubbed together submerged in water, the temperature can be raised, even to boiling point, according to the amount of energy expended.

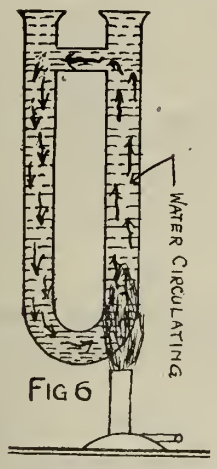


FIG 6

Another very simple illustration which proves that heat is a form of energy can be demonstrated by rubbing two pieces of ice together in a temperature below zero; the surfaces will melt and the water will be found to be several degrees above freezing point.

Temperature and Heat

We have fully learned that heat is a form of energy. What is the difference, then, between heat and temperature? Temperature is not the same as heat, but is simply the condition of some matter, solids, liquids, or gases. For instance, suppose a vessel contains 100 gallons of water heated to 180 deg. Fahr.; another vessel contains only 1 gallon of water at the same temperature. Each vessel would contain water at the same temperature, but one would contain 100 times more heat than the other. Heat is determined by volume as well as by a thermometer. The thermometer gives no record of quantity, but simply of state or condition.

Heat is measured by units, B.T.U., while temperature is by degrees. To define a heat unit, take one pound of water at zero (0 deg. Fahr.), and raise the temperature one degree and one B.T.U. or thermal unit has been conveyed to or absorbed by the water.

The Effects of Heat

When we speak of heating water, or any other substance, it is clearly understood that we are employing some means, either fire, steam, or electric filaments of a higher temperature, or that we are creating in some form or other a condition that will raise the temperature of the water higher than it was before the application of the heating properties.

The heating solids, fluids, or gases sometimes cause certain changes, change of size, change of state, as well as change of temperature. At the same time the application of elements colder than the given body may also have the same effect, though heat generally expands a substance, while cold will contract in varying degree. Water will contract until it begins to freeze, then it will expand. This is why freezing water in pipes bursts the pipes.

A few very simple yet interesting experiments may be carried out to demonstrate the effects which heat and cold have on certain solids, as well as liquids and gases, and these should be tried out in practice so that the reader can see and realize for himself.

Fill up three cream bottles with water, turpentine and alcohol (see Fig. 1). Cork all up, insert a small glass tube through the cork and place the three bottles in a vessel of water; raise the temperature of the water in which the three bottles are placed and watch the different fluids expand. Now allow all three bottles to cool again and place them in the same vessel with snow in. Mix into the snow a quantity of salt, and thus bring the contents of the outer vessel down to freezing point. The bottle of water will contract to freezing point and then expand as it freezes, and it will freeze if sufficient snow and salt are mixed up. while the alcohol will contract as will also the turpentine, thus showing how

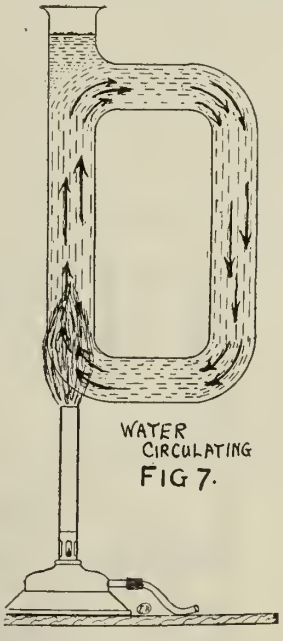


FIG 7.

three kinds of liquids act under heat and cold.

Another experiment with gases or air may be conducted by taking one of the same cream bottles (see Fig. 2), place it empty in the snow and salt, then hold it tube down into water as shown and apply warm wet cloths, increasing the temperature gradually, as as not to crack the bottle, the air inside will expand and globules of air will escape through the water(proving that the air has expanded somewhat.

Now, reverse the experiment just described, keeping the tube submerged in

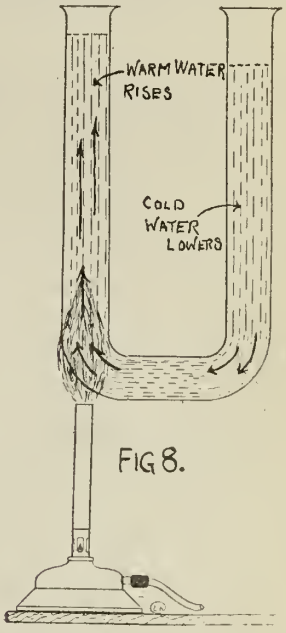


FIG 8.

the water and apply cool cloths, finally placing a cloth bag with snow and salt in it around the bottle and the air will contract to such an extent as to draw some of the water up the tube, as shown in Fig. 3.

Another simple experiment can be practised by taking a well made and tight paper bag into the cold, blow it out, tying up the mouth tightly, then bring it indoors, hold it before a fire and watch how the air will expand the bag to almost bursting point.

To show the difference in expansion of two different metals, take a strip of copper and one of iron, about ¼ in. thick. one inch wide; rivet them together and apply the flame of a gasolene blow lamp to the edges, not allowing the flame to rest on any portion too long. The copper will expand more than the iron and will bend as shown in Fig. 4.

It may be asked by some readers what expansion and contraction have to do with sanitary engineering. The subject is very important and should receive careful thought and attention.

Here is an example of its bearing on sanitary engineering:—Suppose a thread has been cut on a piece of pipe and is being screwed into a fitting; take note of the changing temperature of the fitting and when reasonably warm cease screwing in the pipe, providing the threads are good, it can be taken for granted that the joint will not leak.

Another instance. Consider the fre-

(Continued on page 27.)

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 17

Methods of Preventing the Clogging of Disposal Tile

IN the last article several kinds of screens for sewage disposal plants were described, the intended objects of which were to prevent paper or other solids from passing from the settling tank into the flush tank, from which they might be discharged into the disposal tile and tend to clog the system.

The division wall or baffle in the settling tank shown in Fig. 1 is another method to prevent solids getting into the tile system. It was advocated years ago, and is still, it is understood, used to some extent. The solids may be disturbed by the entrance of the sewage into the first compartment, but the liquid sewage flowing in a thin sheet over the division wall does not disturb the liquid in the second compartment; the trouble in regard to solids getting into the tile is largely obviated by such an arrangement, which, however, is considered an unnecessary precaution in the ordinary small plant.

In this connection the Scott-Moncrieff tank, first constructed in 1891 and illustrated in Fig. 13, might be referred to. It consisted of a chamber filled with large stones, supported by an iron grating, into a space under which the sewage is admitted, and through which the sewage passes slowly upwards, escaping by an overflow at the top. The stones were furnished for the purpose of affording a resting place for the anaerobic bacteria, which acted in a manner to liquefy or break up the solids. These stones no doubt acted also as a sort of filter preventing any large solids leaving the tank, if or when a sudden rush of sewage entered it.

The various means already mentioned no doubt prevent in some cases large solids, and especially paper from getting into the tile system. But in a settling tank of a sufficient size and of proper design, with submerged inlets and outlets, the danger of tile chokage from large solids is probably remote. The great difficulty is with the smaller solids or fine suspended matter which, passing easily through any screen, may collect in such quantities in the tile that it cannot be quickly disposed of by bacterial action. Observation has shown that during hot weather gas will be formed in a septic tank three weeks after it is placed in service. In colder weather it may require six or eight weeks. But as soon as the gas production occurs the contents of the tank are disturbed to a greater or less extent, but generally sufficient to cause fine suspended solid matter to pass out of the tank. Mr. Waldo S. Coulter, C.E., states that this "unloading" goes far toward explaining the phenomenon of the septic tank that has been in operation for several years, and yet contains less than 50 per cent. sludge; and that he has never seen any arrangement of baffles that could prevent this unloading from the ordinary septic tank when gas was being formed. The result is frequently choked tile fields when there is every probability that the sewage may appear at the surface to form wet ground resulting in time in obxnoxious odors. Therefore, Mr. Coulter finds the ordinary septic tank of the "single storey horizontal flow" type objectionable unless it is used merely as a sedimentation tank. This would call for a cleaning of the tank at least every six weeks, and probably oftener. For residential plants that is not ordinarily practicable, and in most cases would result in a nuisance.

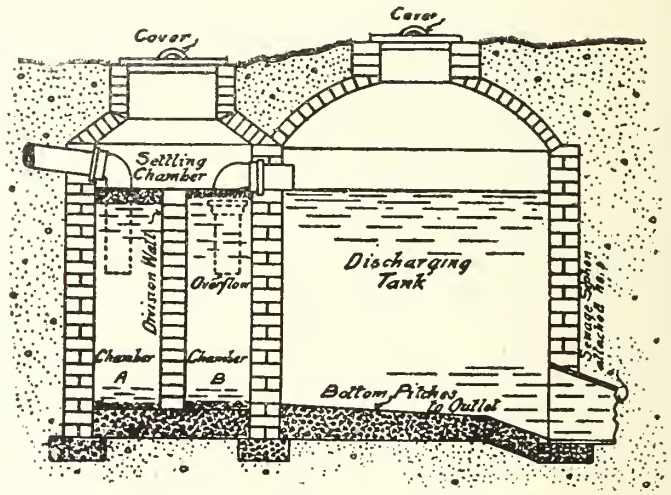
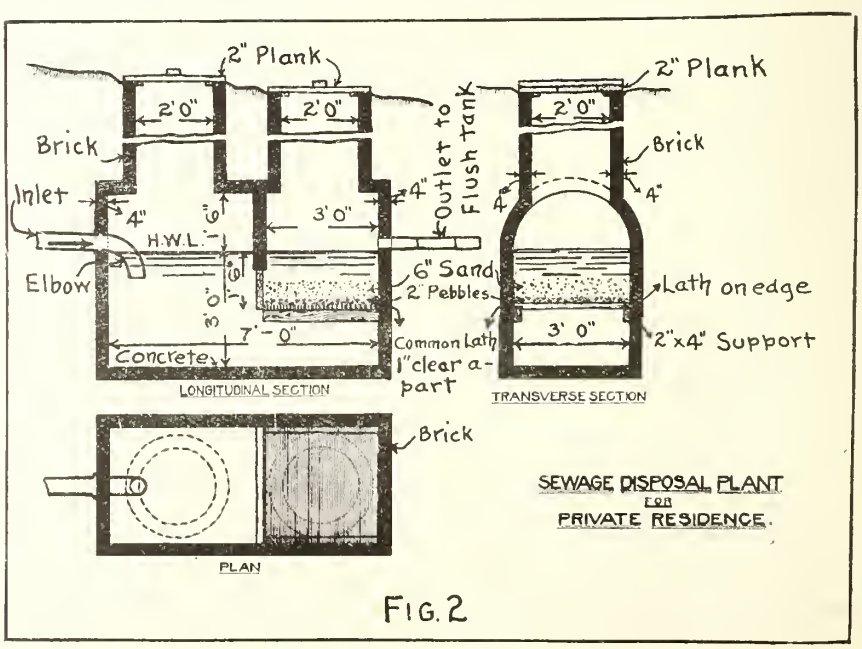


Fig. 1.

When the tiles are choked, proper purification is, of course, not taking place. Finally, the sewage may dis-



charge so slowly from the syphon chamber that the tile will have to be taken up and relaid just to allow the sewage to get away, apart from sanitary reasons, which would demand relaying the tiles at the first indication of clogging. Where such conditions are found what steps should be taken to prevent future clogging of the tiles?

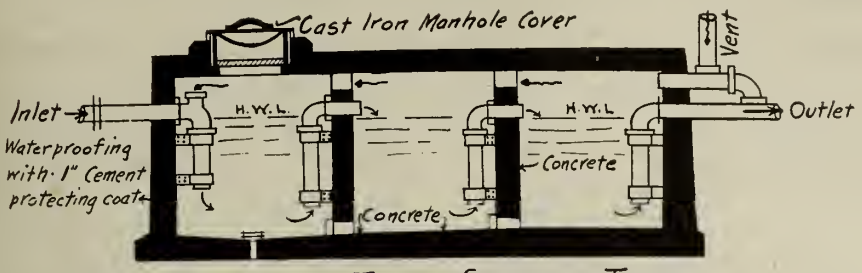


FIG. 3 — SECTION OF TRIPLE SETTLING TANK

The tank shown in Fig. 2 was designed by Prof. Anson Marston, of Iowa State College, to retain all solid matter in the septic chamber. It might be termed a modification of the Scott-Moncrieff tank, smaller filtering material being used. Prof. Marston found that even in spite of the sand filter considerable fine black sediment came out of the tank.

In Fig. 3 is shown a septic tank installed by the Department of Indian Affairs in some of their schools. It is understood that in accordance with modern practice a syphon is now specified by that Department as an essential part of

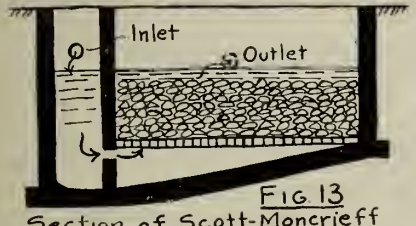


FIG 13
Section of Scott-Moncrieff "Cultivation" Tank, 1890-91

a sewage disposal plant. But this "triple" settling tank design is interesting on account of the fact that the trouble of fine suspended matter clogging the tile has been (according to the statement of Mr. Chene, sanitary engineer to the Department), entirely obviated—at least in sandy soils—without the use of a syphon. Whether in the absence of the desirable intermittent flow produced by a syphon and providing periodic rest and aeration for bacterial activity, the liquid continually trickling from the overflow has been purified is, of course, another question. In some instances wire screens around overflow pipes, as described in the previous article, have also been used in these tanks.

The gas disturbances encountered in the ordinary septic tank are avoided in what is known as the Imhoff, one form of which is shown in Fig. 17. The fresh sewage enters near the top of the tank, across which a couple of baffles are placed. In flowing between the inner partitions the solids fall through the slot to the bottom of the lower compartment. The liquid sewage leaving the tank is not affected by gas in any way, as the gases from the sludge rise on either side of the partitions. Any fine solid particles carried up with the gases sink again as the gas escapes at the top of the tank. While the trouble due to gas disturbance is thus avoided, it has unfortunately been found that the Imhoff tank is otherwise not well suited to residential installations, even for large residences or institutions where cost is not a prohibiting factor. This may appear as strange when the Imhoff tank is known to have proved so satisfactory for municipal plants. But the fact is that from residences alone there is a greater proportion of grease, unbroken solids and intact paper to pile up against scum baffles or adhere to partition slopes, requiring too much cleaning and attention for a successful residential plant.

As a solution of the various difficulties encountered with both the ordinary septic tank and the Imhoff tank, Mr. Coulter has suggested a combination of the two, as shown in Fig. 4. When, as in the septic tank shown, the flow of sewage is brought into the bottom of the tank, it is then known as a Biolytic tank. In this tank solid matters are considerably broken up and reduced. The liquid sewage flows over a circular weir into a collecting channel around the top of the tank, and thence is conveyed by a pipe into the Imhoff tank. What fine solids do pass into the Imhoff tank are not liable to adhere to the sloping partition or baffles.

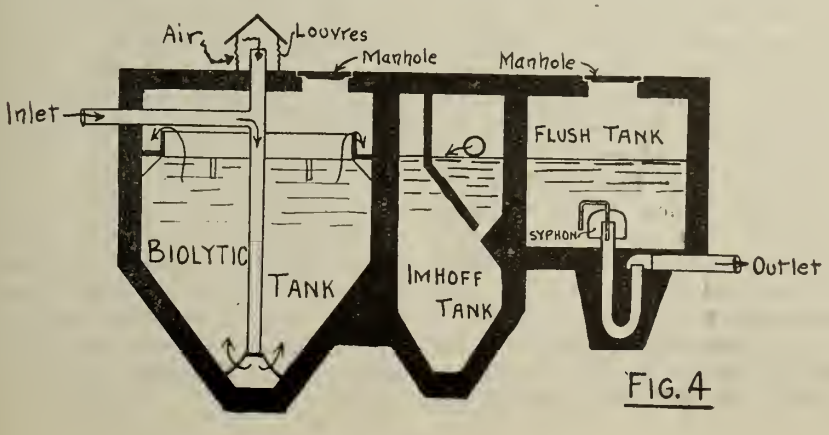


FIG. 4

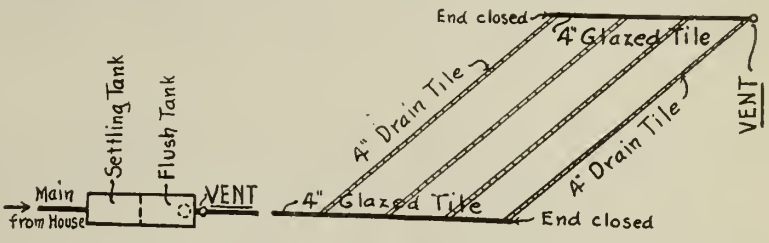


FIG. 5 — PROPOSED PLAN OF TILE FIELD

(Continued on page 30)

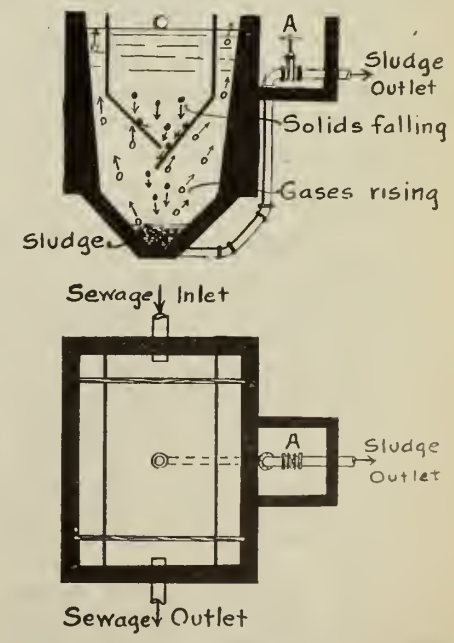


FIG 17 — A Modified Imhoff Tank

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Business in the plumbing trade has been somewhat quiet, owing to the absence of extensive building operations in dwellings. Installations for industrial concerns have been fairly good, as these plants are working at capacity and some new plants have been erected. In valves, business has been good, principally in steam work, which would indicate that installations for industrial concerns are fairly numerous. There have been a number of price advances during the period since last issue, the majority of which were in an upward direction. A decline of 1c per pound was recorded in the price of lead pipe and lead waste pipe. Advances have taken place in wrought iron pipe, globe, angle and check valves, soil pipe and fittings, galvanized sheets. There are no indications, as yet, that lower prices can be looked for in the near future.

TORONTO, Jan. 14.—There is considerable repair work going on and some new industrial plants have been built and others have been extended. This has made trade good in certain branches. There have been increasing costs in the production of plumbing materials through the steadily advancing price of raw materials and the greater labor cost. Labor cost is more and more coming to be a serious item with many concerns. Many of the most efficient men have enlisted and their places have been taken by less efficient. This has meant that in many instances larger working forces are required to do the same work formerly done by fewer men. Where it has been impossible to get or utilize larger working forces the output necessarily is cut down. With the coming of peace conditions again the plumbing trade looks forward to bigger business.

Lead Pipe and Waste Pipe Show Decline

LEAD PIPE, ZINC, SOLDER.—One of the few exceptions to the generally upward trend in prices has been in lead pipe and lead waste pipe. Lead pipe is now quoted at 13c per pound, which represents a decline of 1c. Lead waste pipe is quoted at 14c as compared with 15c previously. Lead wool is holding steady in price at 12c per pound and lead sheets have also maintained previous prices.

There is a steadiness in the market for all lead, zinc and solder products. Lead traps and bends are still quoted at net list. Wire solder is quoted at 27c to 35c per pound according to the grade. Zinc sheets are quoted at 25c per pound, spelter at 13c per pound and pig lead at 9¼ to 9½c. In the primary market in New York pig lead held steady during the week and is quoted there at $7.40 to $7.50 per hundred pounds. Following are the quotations:

Spelter, lb.	$0.13	.....
Pig lead, per lb.	0.09¼	$0.09½
Lead pipe, lb.	0.13	.....
Lead waste pipe, lb.	0.14	.....
Lead traps and bends	Net list	
Lead sheets, 3 lbs. sq. ft.	0.12¼	.....
Lead sheets, 3½ lbs. sq. ft.	0.12¼	.....
Lead sheets, 4 to 6 lbs. sq. ft.	0.12	.....
Cut sheets, ¾c lb. extra and cut sheets to size 1c lb. extra.		
Solder, guaranteed, lb.	0.28½	.....
Solder, strictly, lb.	0.26	0.28
Solder, commercial, lb.	0.24½	.....
Solder, wiping, lb.	0.23	0.26
Solder, wire, lb.	0.27	0.35
Lead wool, lb.	0.12	.....
Zinc sheets, per lb.	0.25	.....

Wrought Iron Pipe Has Again Advanced

PIPE.—An advance in the price of wrought iron pipe has established new levels for that commodity. In the standard buttweld and lapweld pipe the advances are considerable and range all the way from 50c on the smaller sizes to $8 on the 10-inch lapweld pipe. On the buttweld pipe, for instance the ⅛-inch size has been advanced from $5.50 per hundred feet to $5.75, while the 4-inch buttweld is now quoted at $75.76 per hundred feet as compared with $73.58 formerly, or an advance of $2.18. On the standard lapweld the 2-inch pipe has advanced from $26.83 to $27.57, a gain of 74c per hundred feet. For the 10-inch size of the lapweld the advance has been from $315.20 to $323.40 per hundred feet, or an increase of $8. Other sizes between have proportional advances. Following are the new prices now in effect:

	Per 100 ft.	
Buttweld	Blk.	Glvd.
⅛ in.	$ 4.25	$ 5.75
¼ in.	3.54	5.67
⅜ in.	3.54	5.67
½ in.	4.59	6.16
¾ in.	5.64	7.76
1 in.	8.33	11.48
1¼ in.	11.27	15.53
1½ in.	13.48	18.56
2 in.	18.13	24.98
2½ in.	28.67	39.49
3 in.	37.49	51.64
3½ in.	46.92	63.94
4 in.	55.59	75.76
Lapweld—		
2 in.	21.00	27.57
2½ in.	31.59	41.83
3 in.	41.31	54.70
3½ in.	51.52	68.54
4 in.	61.04	81.21
4½ in.	71.12	94.62
5 in.	82.88	110.30
6 in.	107.50	143.00
7 in.	142.80	186.80
8 in. L.	150.00	196.30
8 in.	172.80	226.10
9 in.	207.00	270.80
10 in. L.	192.00	251.20
10 in.	247.20	323.40

Terms 2%. 30 days approved credit.

Prices for Ontario, Quebec and Maritime Provinces.

Globe, Angle and Check Valves Again Up

VALVES.—An advance of approximately 5 per cent. has been made in the price of globe, angle and check valves for the high grade and medium pressure. Where the discount on the high grade was formerly 22½ per cent. it is now 20 per cent. On the medium pressure valves the discount has been changed from 45 per cent. to 40 per cent. Discount on the quick opening radiator valves is now quite general with dealers at 60 per cent. off list. Formerly some were quoting at 60 per cent. and others were quoting at 65 per cent. All other classes of valves remain unchanged, with the exception of brass gate valves which have registered a considerable advance. Where formerly the discount was 30 per cent. off list it is now 22½ per cent. There is a firmness in the market for all valves owing to the high price of raw materials. Labor also is an increasing factor of importance in the high cost of production. Demand for these articles has been good, particularly so in valves for steam work. Following are the discounts:

	Per Cent.
Ground work	45-47
Compression work, standard	55
High grade	48
Cushion work	40
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2, standard	49-53
High grade	40
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Steam cocks, standard	53
Steam cocks, high grade	50
Globe, angle and check valves, standard	25
High grade	20
Radiator valves, standard	30
High grade	30
Patent quick opening valves	60
Basin Cocks—	
No. 0 & 1, Fuller pattern	53
No. 0 & 1, compression	49
Midget	51
Steam cocks, square nut	50
Steam cocks, iron body	45
Globe, angle and check valves, medium pressure	40
Radiator valves, standard	60
Radiator valves, Jenkins disc	60
Radiator valves, quick opening	60

Enamelware Holds Steady; Demand Light

ENAMELWARE.—Prices in enamelware have held steady since last issue. The last advance in these articles was recorded on December 15 when the bathtubs and sinks advanced. The demand for these articles is somewhat limited at present owing to the absence of any extensive new building operations of dwellings. An occasional house is being built here and there but generally speaking operations along this line are down to the minimum. Following are the prices prevailing at the time of writing:

30-gallon range boilers, standard	$10.00
30-gallon range boilers, extra heavy	12.50
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	23.70
Bathtubs, 5½ ft.	27.30
Sinks, roll top, 18 x 30 in., staple	12.15

Oakum Prices Hold in Steady Market

OAKUM.—The market for oakum has held steady. Plumbers' spun oakum is quoted from 8 cents to 8½ cents per pound, while Best American is quoted from 20½ cents to 21 cents. There is a reported scarcity of oakum in the United States with consequent higher prices prevailing there. Demand for oakum is light at this time of the year, but with the coming of spring is expected to pick up. Following are the quotations:

	Per Lb.	
Plumbers' spun	$ 0.08	$ 0.08½
Best American	20.50	21.00
U.S. Navy (American)	20.00	20.35
Clipper U.S.	18.00	.....
U.S. Navy (English)	16.50	.....

Soil Pipe and Fittings Have Been Marked Up

SOIL PIPE.—An advance has been recorded in the price of soil pipe and fittings by the change of the discount on these commodities. Where the discount on medium and extra heavy pipe 6-inch and under was formerly 60 per cent. it is now 55 per cent. For 8-inch pipe and larger the discount is now 40 per cent. as compared with 45 per cent. formerly. For fittings the discount is now 60 per cent. for both medium and extra heavy as compared with 65 per cent. formerly. There is a firmness in the market for this product and with heavier demand there would undoubtedly be still higher prices.

Galvanized Sheets Have Gone Up in Price

GALVANIZED SHEETS.—One of the well-known brands of galvanized sheets has advanced in price 80c per hundred on all the various grades. There is a firm market in these products and there is strong probability that another of the well-known brands will advance 50c per hundred pounds in the near future. Following are the prevailing prices on the two brands to which reference has been made:

	Per 100 Lbs.	
10¾ oz.	$8.30	$7.50
28 gauge	8.00	7.20
26 gauge	7.70	6.90
22 and 24 gauge	7.55	6.75
18 and 20 gauge	7.40	6.60
16 gauge	7.25	6.45
14 gauge	7.25	6.35

Conductor Pipe Holds at Recent Advances

CONDUCTOR PIPE.—The market for conductor pipe, eavetrough and eavetrough conductor elbows has held steady in price since the recent advance recorded in last issue. The discount on these articles is now 35 per cent. The demand for conductor pipe is somewhat light in the face of minimum building operations. Following are the list prices on these articles:

Plain Conductor Pipe.

2 in., in 10-foot lengths	$ 8.00
3 inch	9.70
4 inch	12.80
5 inch	17.50
6 inch	21.30

O. G. Eavetrough.

8 inch	$ 6.90
10 inch	7.70
12 inch	9.10
15 inch	12.50

Eavetrough Conductor Elbows.

2 inch	$ 1.90
3 inch	2.20
4 inch	3.60
5 inch	9.00
6 inch	10.50

Above lists subject to 35 per cent. discount.

BRITAIN TO REMAIN THE WORLD'S BANKER

What expectations financiers of the United States may have had of that country becoming the world's banker as a result of the great struggle in Europe and the tremendous financial strain Britain is bearing are going to be disappointed. In an article in the annual number of the *Monetary Times*, John Stuart Thompson, the notable publicist and a citizen of the United States, frankly declares that Britain will be richer than ever. Analyzing the financial status of the United Kingdom, Canada, the United States and Germany, he says:—

"No matter how pessimistically facile arithmeticians roll up the cost of smoke and shell, the fact remains indisputable that the Allies will take the cream off the world's bottle of milk, no matter how much the Teutons shake the bottle. Sea power brings this about. It is indisputable that Russia will be richer than ever in stirred up, newly-discovered and expanded resources. It is certain that Japan can now pay her financial debt to Britain, the world's banker. Britain is richer than ever, for she holds the bonds and notes of the Allies, whose trade, by naval, financial and maritime power, she also holds in rein.

"The Teuton will drown himself in the lake of his folly, dragging two millstones from his neck, both tax and loan. Teutonia will finally adopt the policy of repudiation of her internal loans, in exactly the way the Confederate States were compelled to do."—Mail and Empire.

Now, what does such news mean to sanitary and heating engineers?

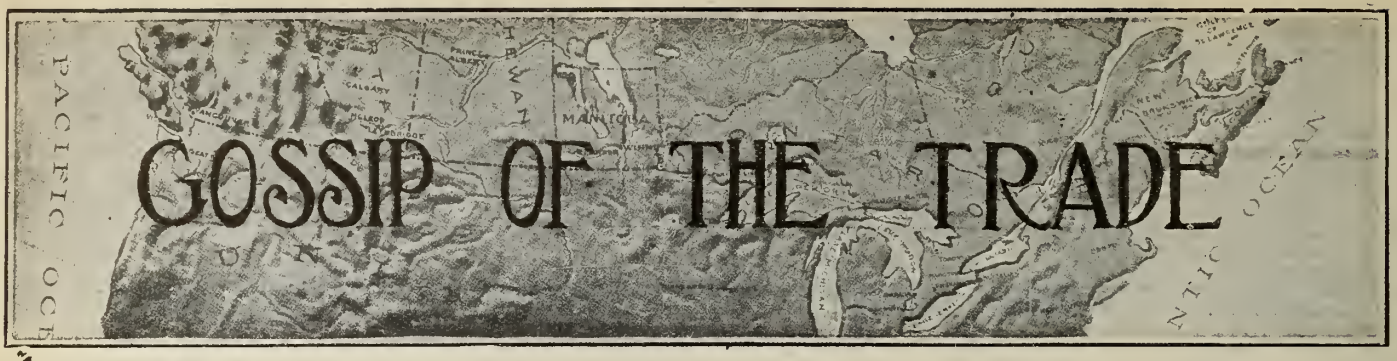
Does it mean that things will be allowed to go in in the same old way? Or is there going to be every preparation made towards adopting progressive measures?

There are scores of matters which should be taken up before true economic progress can really be claimed.

Britain will no doubt be richer in this world's goods after the war but her wealth to be truly valuable must be expended in a proper way, economic constructions must be the rule, original outlay will not be the rule if efficiency is aimed at. The reason why members of our trade are kept so busy making repairs is because the installations were not built in the first place with sufficient foresight.

It is estimated that at least 30 per cent. of the repairs made could be dispensed with, if in the first place true economy had been practised.

The sanitary and heating trade should keep this point in view when tendering on new work and in that way conserve the wealth of the country.



MANITOBA BANNS THE COMMON DRINKING CUP AND ROLLER TOWEL

The common drinking cup and roller towel were abolished throughout the Province of Manitoba by a new regulation on Nov. 16th of this year by the Provincial Board of Health. The decision abolishing the drinking cup is a real charter of health-protection for the children, the workpeople, in fact, for everybody in the province.

All those of the craft who are members of this progressive community will probably desire to be in line with their fellow-citizens in providing the best facilities for obtaining drinking-water in any building for which they are responsible, whether it be a school, office, factory, store, hotel, theatre, or other place of public resort, and every sanitary engineer in the province should show his interest in sanitary drinking fountains by writing those manufacturers that have put this commendable line of brass goods on the market.

PASSED ON

The SANITARY ENGINEER desires to join the many friends of Roy Spence in expressing their heartfelt sympathy to him in his bereavement. His father passed on to the Great Beyond on Sunday, January 7.

Mr. Roy Spence was recently appointed manager of the Toronto branch for Warden, King, Ltd., and the loss of his father proves doubly trying at this time.

BRANTFORD WATER FROM THE GRAND RIVER

In a report prepared at the request of the City Council, City Engineer T. Harry Jones and Medical Officer of Health Dr. F. G. E. Pearson recommended that Brantford's water supply in future be taken from the Grand River above Wilkes' dam, and mechanically purified and chlorinated. At present the water comes from collecting galleries after natural filtration.

MONTREAL BUILDERS' EXCHANGE

To the Builders' Exchange of Montreal under the able leadership of Secretary Trotter and J. P. Anglin of Anglin's Ltd., Montreal is due chief share of the credit for the Quebec Government's decision to force a settlement of the Tramways controversy at an early date. A committee from the Exchange first took up the matter last summer and have since been the foremost agitators of the move and with the results indicated.

Mr. Trotter is also the secretary of the Montreal Master Plumbers' Association, and deserves great credit for the good work he is doing in this dual position.

BOWLING TOURNAMENT

There was "some" excitement at Orr's Bowling Alley a few nights ago, when those two celebrities of heating goods fame, Myles Macdonald and Al. Coleman, decided to "have it out" with each other.

Here's the whole blood-curdling story: It happened thusly. Once upon a time Myles Mac and Coleman were racing along the road, and after exchanging their views of each other and the weather, it transpired that they were both going to quote prices on a bunch of heating goods for the same job. Phew! Biff! Hot stuff!

"Look here, Coleman," says Mac, "I'll play you a game at bowls, and I'll beat the —— out of you, etc., etc." Now anyone being acquainted with Coleman knows right off the bat that such a line of warm goods could not go unchallenged.

Each called upon their lieutenants, T. D. McKellar for Macdonald and W. R. Blackhall for Coleman, who arranged the date for the fray.

The results were as follows:—Messrs. Macdonald and McKellar, the challengers, rolled up 122 against Coleman and Blackhall 185, which means that in the bowling game Mac lost, but we have not heard who got the order for the heating goods. Possibly one got the order for the boilers, the other for the rods. Things happen that way sometimes in business.

An Interesting Judgment

The Law Maintains That Overhead Expenses Are a Legal Charge and Cannot be Left Out of Regular Business Transactions.

OVERHEAD costs in connection with a sanitary engineering contract formed the crux of a question recently decided at law before Judge Greenshields, in the Civil Courts of Montreal. The parties in the case were an important firm of Montreal sanitary and heating engineers, and a firm of wine and spirit merchants, also of Montreal. The amount in dispute was not very large in proportion to the amount of business which has been at previous times transacted between the firms in question, but the fact that the court upheld emphatically the principle that overhead costs of the contractor undertaking the work, are, as a matter of course, chargeable by the contractor in his account, and are as essentially legitimate and allowable charge, was, in the opinion of leading sanitary engineers in Montreal, the all-important aspect of the case.

Facts brought out in course of the case are briefly as follows:—

The work was some additional pipe fitting and equipment required by the wine merchant for whom the contracting firm had already undertaken a considerably larger contract. Actual cost of the work done would amount to about $1,000.

In confirmation of a telephonic agreement to do the job, the contractors wrote

to the architect a letter, the essential part of which was the following clause:

"Not knowing exactly what plumbing work was required for the present, said that we would do this work on a percentage basis, and we agreed to do the same AT COST PLUS 15 PER CENT."

This clause in the letter confirming the telephonic agreement to undertake the work constituted the tender. The dispute arose over the point as to whether the expression AT COST should be taken to include overhead charges as well as other expenses of the work to the contractor. There was no dispute as to the work, or the 15 per cent. The understanding was that the work should be done on a time and material basis plus 15 per cent.

Previous to the commencement of litigation, the firm having the contract work undertaken requested from the contractor on its completion, before payment of the account, full details of the actual cost. These details were to be supplied in the form of the cost invoices from the jobbers supplying materials, showing all trade discounts allowed, also the time checks of the employees engaged upon the job, showing the exact payments made in wages. These were all duly provided, and the contractor added to them a percentage to cover his overhead expenses.

The total amount of the account rendered, including overhead costs, was $1,378.64.

A percentage considerably below that found necessary by this firm of sanitary engineers for their usual run of undertakings was charged, because the work was in the nature of an extra over and above fairly large contract work already undertaken for the same firm of wine merchants.

The item of overhead charges in the account was disputed, and payment was denied. The sanitary engineers sued the wine merchants for the amount. The case came before His Honor Judge Greenshields, who decided in favor of the plaintiffs very speedily and very emphatically.

"If any business man were to try and do business without charging his overhead expenses in addition to his invoice costs, he would soon be in the bankruptcy court," said the Judge.

ONTARIO BOILER RULES REVISION

A PROPOSAL is under consideration to revise the Rules and Regulations covering the construction and inspection of steam boilers in the Province of Ontario. A meeting was called by Dr. Riddell, superintendent of the Trades and Labour Branch of the Department of Public Works at the Parliament Buildings, Toronto, and Dec. 28, for the purpose of ascertaining the views of those interested. It is proposed to prepare a Bill for presentation before the Provincial House, which will be a revision of the Act already in force. The delegation consisted of representatives of steel and cast iron boiler manufacturers, boiler inspectors, stationary engineers.

Dr. Riddell in calling the meeting to order asked for a frank discussion of the proposed rules and said he would be glad to receive any suggestions that might be helpful in the preparation of a Bill that would meet with the approval of all the interests concerned. The proposed rules which were read by D. M. Medcalf, chief boiler inspector, were discussed in detail and suggestions taken down in the minutes.

At the conclusion of the meeting it was decided to send copies of the minutes to all boiler manufacturers, inspection companies, etc., who will in turn submit their views to Dr. Riddell. It was further decided to appoint a committee composed of two representatives from each of the following interests:— Steel boiler manufacturers, cast iron boiler manufacturers, boiler inspection companies, stationary engineers, boiler users, and manufacturers of fittings. The committee will confer with Dr. Riddell and will be authorized to make any suggestions which will tend to improve the present Act.

PRACTICAL SANITARY ENGINEERING

(Continued from page 21.)

quent cause of leaks in brass waste traps. When fitting these up they should not be subjected to any spring or strain because if they are, hot water passing through will create a further strain due to expansion and the fine threads at the joints are apt to strip.

On the other hand, when making up threaded joints on hot water piping, care should be taken not to screw them up too tight, because when the hot water passes through the pipe it is liable to expand and strain the pipe to such an extent that when it cools a leak will be the result.

No piping, whether for cold or hot water services, steam or hot water heating systems, should be bound so as not to allow them room for expansion lengthwise.

In hot water heating systems it is the expansion of the water that causes it to circulate and flow upwards while the contraction of the water causes it to flow downward, or return to a lower point. Atom for atom, the hot water is lighter than the cold.

Try this example: Take a bent glass tube with connecting pipe and apply the flame of a burner to the middle, as shown in Fig. 5; the warm water will boil and steam will rise from the bottom up through the water, but just before it boils it will be noted that the water has expanded somewhat. Now move the flame of heat to one side, as in Fig. 6, put a few drops of coloring into the side which the flame is under and watch the almost instantaneous circulating movement. This can be made to circulate quicker if the leg opposite the flame is slightly cooled with a cold wet cloth.

Fig. 7 shows another form of tube used for such experiments. If the open end were made, say, a foot long and filled to the top, and a small thermomenter inserted, it would be found that the water would circulate more rapidly, thus proving that the extra height of water, which creates a greater pressure also increases the heat of the water very slightly. Fig. 8 shows a bent tube with no connecting piece. In this case the heated column of water would rise, or expand, and the column of the opposite side would show a slightly lower level for a few moments, until the whole of the water became of the same temperature.

(Continued in next issue).

PRACTICAL SHEET METAL WORK

(Continued from page 17).

section by drawing solid curved lines. These curves represent the desired pattern of the branch piece.

Figs. 4 and 5 show plan elevation and pattern of a 90-degree elbow. The same method is adopted as was described in developing the branch for the T-piece. Allowance must be made for laps or seams, as the came may be, in accordance with instructions given in the last article, No. 6.

(Continued in next issue.)

VOLCANO WILL BE BUSY CREATING WHITE COAL

The idea of harnessing volcanic energy in the service of man is old, but it has been practically carried out for the first time in an installation which has recently been erected near Volaterra, in Central Italy. At this point there are cracks in the ground from which very hot steam spouts constantly. Boreholes from 12 to 20 inches in diameter were first driven down and watched for long periods. They were found to discharge from 1000 to 2000 theoretical horsepower per hour. Then it was decided to utilize the power.

Three turbine engines, of 15,000 horsepower in all, have now been installed to use this steam in generating electricity at Laudrelle. The first started in January, the second in April, and the third within the past few days. The first two have been quite successful and have conferred a great boon on the people of Tuscany, especially now that coal is so dear.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

OVERHEAD EXPENDITURE PUZZLE

Editor the SANITARY ENGINEER:—

The articles you are publishing in the SANITARY ENGINEER entitled "Cost of Doing Business," are very interesting to me, and I hope you will continue them for some time. I may be asking something which will be of interest to some of your readers, as well as myself in the following problem and which you may perhaps deal with in these articles. Here is what I am up against:

I have just recently finished a $4,000 job, and took it on a percentage basis, but told my customer that my overhead expenses were 25 per cent., and that I would have to add at least 5 per cent. profit.

I do not wish to go into details as to whether my method of arriving at these expenses is proper, but here is my case. When the job was done and all was paid for, it amounted to $4,000; there happened to be some material left over, and the owner wants me to take it back. He paid me $125 for the goods and he wants me to pay him that sum back for them, whereas I have offered him $93.75, which just covers my overhead expenses, but gives me no profit on the goods. He now comes back and declares I have been charging him too much, saying that if $93.75 is the cost, the goods should only have amounted to $117.19 in round figures, and including the profit, a total of $121.88, instead of $125, the price I have charged him. He will not show me how he figures it out. Hence I am at a loss to know where I stand. I can't really get my mind to a point which will prove that I am right and he is wrong. Will you show how this matter can be straightened out?

A. S. Overhead Expenses.

In the first place, there is quite a difference between percentage on and percentage off. If you were to charge a straight 30 per cent. on the $100 the figures would be $130, but to take off 30 per cent. would be 30 per cent. off $130, $39, or $91 left, a loss of $9 on the deal.

In connection with the question under discussion, you say, "I do not wish to go into details as to whether my method of arriving at these expenses is proper," but you tell us that you have offered $93.75 for the goods back, which includes your overhead. This proves that if your customer paid you $125 for a bill of goods your overhead expenses were 25 percent., and you added 5 per cent. profit, that $125 being selling price. 25 per cent. off $125 would be equal to $31.25, and 5 per cent. profit on $125 selling price would be $6.25.

Your method is correct, and you have merely deducted $31.25 from the selling price and have relinquished any profit claims. Your customer, however, is trying to prove to you that you charged him too much, but evidently he is in the wrong, his figures prove that he is taking $93.75 as the basis upon which to arrive at overhead expenses and profit.

In round figures, he takes $93.75 and divides it by 4, which is 1-25th of the results, $23.44; he adds that to the $93.75, making $117.19. Again using the $93.75 as basis for profit, he multiplies 93¾ cents by 5 and procures $4.69; this he again adds to $117.19 and procures the total he speaks of, viz., $121.88.

This is a very common method used by many, but that is the reason why so many men fail in business. They forget that the true basis of all overhead expenses and profit, is the selling. You would do well by taking this matter up in this way. For instance, you are willing to take the goods back for $93.75 and your overhead expenses are 25 per cent. Very well. The total 100 per cent. is the selling price, $125, and $93.75 is 75 per cent. of the total. It must be. If $125 is the total 100 per cent., 25 per cent. is $31.25, and the two sums, $93.75 and $31.25, amount to a total of $125. If your customer raises the question of profit you can point out that you have not deducted the profit, you have relinquished this sum, because if you had charged back your profit it would have figured out in this way: $125 total selling price, 25 per cent. overhead, and 5 per cent. profit; total 30 per cent., leaving 70 per cent. the balance.

Now, 70 per cent. of $125 amounts to $87.50, and you have offered $93.75 for the goods.—Editor.

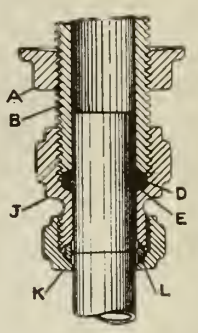
REMEDYING WATER HAMMER

There are several conditions under which "water hammer" may be established. One may be by suddenly opening and closing a faucet, or by partially opening a faucet in which there are some loose parts, as explained on page 34 in the last issue. Then there is "water hammer" set up in steam heating systems, as well as water systems. In a steam system, this trouble is caused by there being water imprisoned in some part of the system, and being "held up" under a vacuum or confined in a radiator. Suppose a radiator valve is turned off, and there is a certain amount of steam in the radiator at the time, the steam condenses, and even though the valve may later be opened, there has been a vacuum established in that radiator, and the water is still there. Now we turn on the flow and return, the cold water meets the steam at both the flow and return, because the valves are, oftener than not, both on the same level and the specific gravity of the water being much greater than the steam when they meet, the cold water and the hot steam, miniature explosions result. The same on the return, some of this cold water of condensation flows down a return and meets return hot water from some lower radiators, or radiators that have previously been left open all the time. In other cases the

Continued on page 30.

Another Evidence of Mueller Progressiveness

Adjustable Lock-Joint Connection



(Patent No. 157091, 7/28/14)

A Practical Appreciation:

Plumbing and Sewer Inspector,
223 James Ave.,
Winnipeg, Man.

Messrs. H. Mueller Mfg. Co.,
Sarnia, Ontario

May 2nd, 1916

Dear Sirs,

Referring to our previous correspondence and to the testing of new Adjustable Joint, I beg to state that the sample submitted by you some time ago was thoroughly tested out on the 13th ulto.

The test was made at the City Machine Shops, and the joint stood a test of 1200 lbs. pressure without showing a leak and it was only the pipe bursting to which connection was made with the machine which prevented us exerting even a greater pressure. I consider this an excellent showing and as I stated in a previous letter, I have no hesitation in placing your new Adjustable Joint out of the class commonly known as Slip Joint. So far we have not been able to find any good arguments against using it.

Yours very truly,

Jas. Smith
Plumbing and Sewer Inspector

JS/CB

The Adjustable Lock-Joint Supply has all the **Adjustability** of the Slip Joint; it is as **positive** and **dependable** as a union connection.

Under test at our factory the Adjustable Lock-Joint Connection withstood **3900 lbs. pressure** without leaking. At this pressure the tubing burst.

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S.E.

H. Mueller Mfg. Co., Ltd. Sarnia, Ont.

Send me sample and prices on your Lock-Joint Supply Connection, Reamed for (....) O.D. Tube.

Signed .....

City .....Prov.....

steam will rise in an open radiator and will suddenly condense, because of the coldness of the radiator, and the water goes off into the mains in slugs. These slugs or solid bodies of water meet the steam and water hammer is established.

Water hammer in cold water supply systems is experienced, too, in many ways, but to eliminate this trouble, air chambers can be fitted to the terminals or faucets. In the old days of lead very little trouble with water hammer was found. Why? Because in almost every case every faucet would have a piece of pipe extending upwards and a small spear head, or other ornamentation fitted to it; this acted as an air chamber; later on those who dispensed with this ornamentation, and knowing what it was for, would fit on an air chamber on the main near to where the water entered the building.

To remedy water hammer in heating systems, drip pipes were fitted up; also small drain vents, as well as a separate system of vents from each radiator to the boiler room. In the old days each radiator would be fitted with a separate return; these would be connected below the water line in the boiler room and each return would also be vented about a foot or 18 inches above the water line.

In all cases of water hammer, it is either proof of poor construction or bad management of the system, and it is gratifying to note that this trouble of water hammer is not as common, comparatively, as it was a few years ago. This proves in itself that the men in the trade are exercising greater care in construction on the one hand, and that those men operating plants are becoming more efficient.—Editor.

VENTILATING A WELL

Editor the SANITARY ENGINEER:

Could you inform me through the SANITARY ENGINEER Question Box, if it is necessary to ventilate a well that has been dug under a building. If so, is one ventilation pipe enough, or would it be better to put in two pipes, so as to draw a supply of fresh air through the well. Further, suppose no pipe were put in, would there be a danger of contamination.—G. S. G.

It would be good policy to ventilate the well, seeing that it is under a building. Under ordinary conditions, the water is very liable to become tainted. One short pipe should lead from the outside, with a fine copper or non-corroding gauze over the opening, and another from the well to above the roof, through the interior of the house, so as to always be warm. The outlet of this pipe should also be covered over with a netting and cap.—Editor.

RURAL SANITATION

(Continued from page 23)

The above various arrangements for preventing the clogging of the tile system have been given, not that they can by any means be all applied to the ordinary problems of house drainage, where cost is such a consideration, but that the reader may keep in touch with the various theories and practice in connection with rural sewage disposal.

There is however one way in which possible clogging of the tiles could undoubtedly be often prevented and at very small extra cost and trouble. The improvement to be described in the tile field would enable the soil surrounding the tile to more easily take care of solids that might find their way into the system and thus possibly clogging would be avoided. Ventilating the tile system has in the past been advocated, when for various reasons the tile had to be placed more than a foot or two below the ground surface. Soil bacteria are found as a rule only near the surface of the ground because there only food and air are readily obtainable. But bring sewage food even at low depths to the bacteria and provide air by ventilating and no doubt sewage purification can take place at even such depths as six or more feet. The necessity for such ventilation has previously not been considered to any great extent for the ordinary tile field though in some cases a vent at the end of the main has been advocated. The following is abstracted from an article that appeared in the *Engineering Record* (September 2, 1916):—

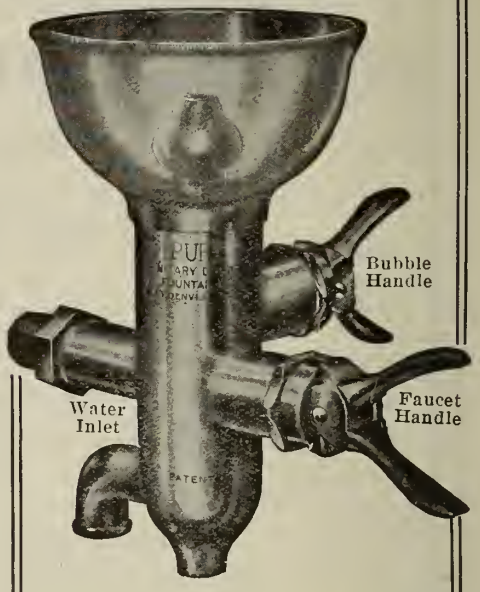
"Referring to tile fields, one defect that may be noted among others is a lack of aeration. In any oxidizing unit, such as a tile field, oxidation is accompanied by the production of a considerable volume of carbonic acid gas which should be removed from the system as rapidly as formed since it operates to retard or prevent oxidizing action. This gas is heavier than air * * * The tile field being entirely below the ground surface retains the carbonic acid gas in the soil pores and tiles, excluding the air, until displaced from time to time by application of sewage. This must markedly reduce the efficiency of the field. An evident improvement would be to connect the ends of the tiles at one side of the field with a ventilation duct terminating in a vent stock with a ventilating hood, and the opposite ends being provided with suitable air inlets."

dently be cheaply accomplished by such an arrangement as shown in Fig. 5. This arrangement has an added advantage in that when the syphon is in operation air in the tiles can quickly and easily escape to make way for an uninterrupted flow of sewage.

The aeration of the tile field could evi-

Continued in next issue.

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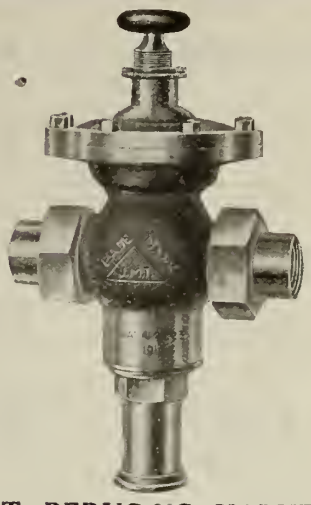
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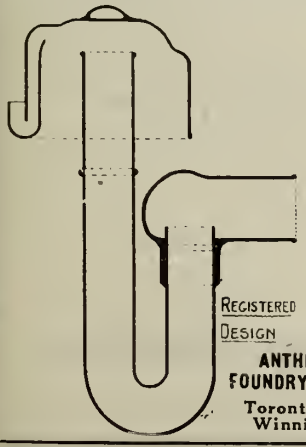
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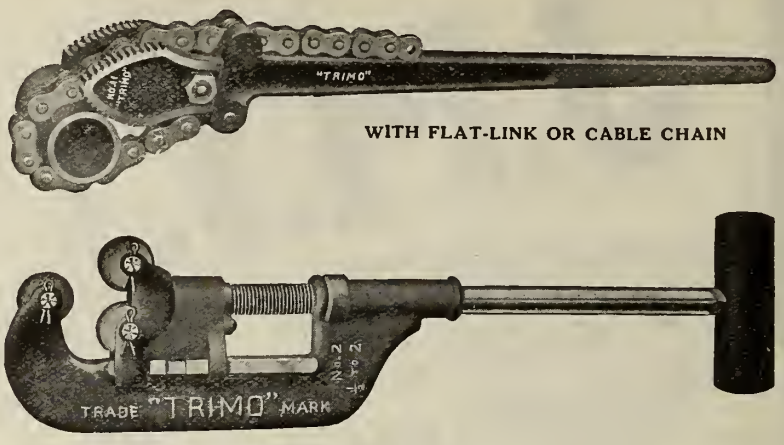
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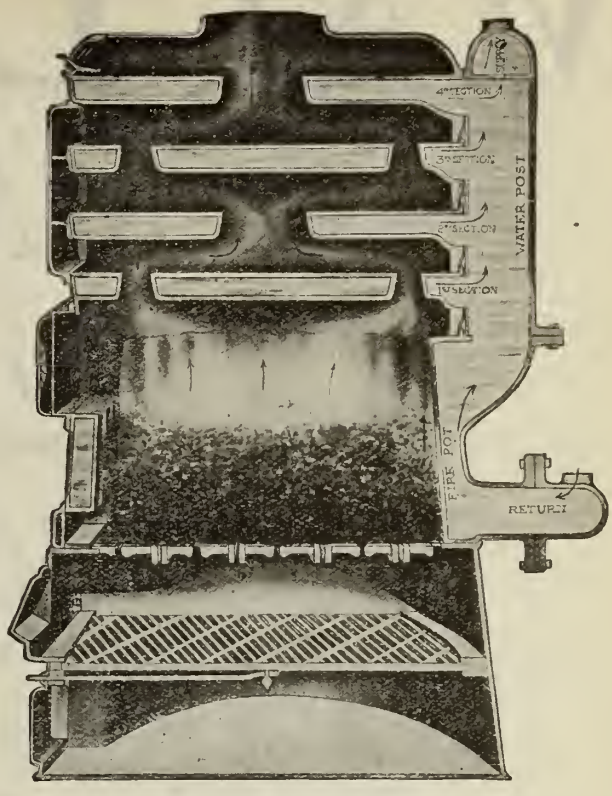
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Anthes Foundry Co. 31

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MACLEAN'S MAGAZINE

for JANUARY

MORE than any other magazine, MACLEAN'S interprets the life, thought and spirit of the Canadian people. It entertains, of course, as a magazine of its class should—this by fine short and serial stories by the foremost living Canadian authors (see "Stories" in the summary of contents on the right, and note that Sir Gilbert Parker begins a new serial in the January MACLEAN'S). But MACLEAN'S does more than entertain: it informs the reader on matters Canadian in a broad way.

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SIR GILBERT PARKER. The opening chapters of a new serial, "Jordan is a Hard Road"—a story of the Canadian North-West, introducing some old friends.

STEPHEN LEACOCK. "In Dry Toronto"—rich humor, combined with a latent seriousness. Leacock is always good.

AGNES C. LAUT. "The Cost of the War"—an international business article by this brilliant Canadian writer, whose intimate friends are bankers and financiers and others with inside knowledge.

BETTY THORNLEY. Another Canadian woman writer with the mind of a business man and with a burning love for her Western homeland. Her contribution—"Putting the Yardstick on Canada," is the story of a journey she made last summer to the Skagway region of British Columbia—a part of that province seldom visited and about which most of us know little.

MAIN JOHNSON. Mr. N. W. Rowell's secretary, and who accompanied Mr. Rowell on his recent trip abroad, and visited THE FRONT with him. Mr. Johnson contributes a vivid story of what he saw and learned on the Western Front.

W. ARNOT CRAICK writes of the New Shipbuilding Industry in Canada—a timely article on a matter of the first importance.

STORIES by the following distinguished Canadian short-story writers: Alan Sullivan, A. C. Allenson, Peter McArthur and H. A. Tandy.

DEPARTMENTS. Review of Reviews, where are condensed for busy readers the best things in current literature; The Business Outlook, a well-informed survey of Canadian business conditions, and Information for Investors, a valuable department for those with money invested or looking for investment.



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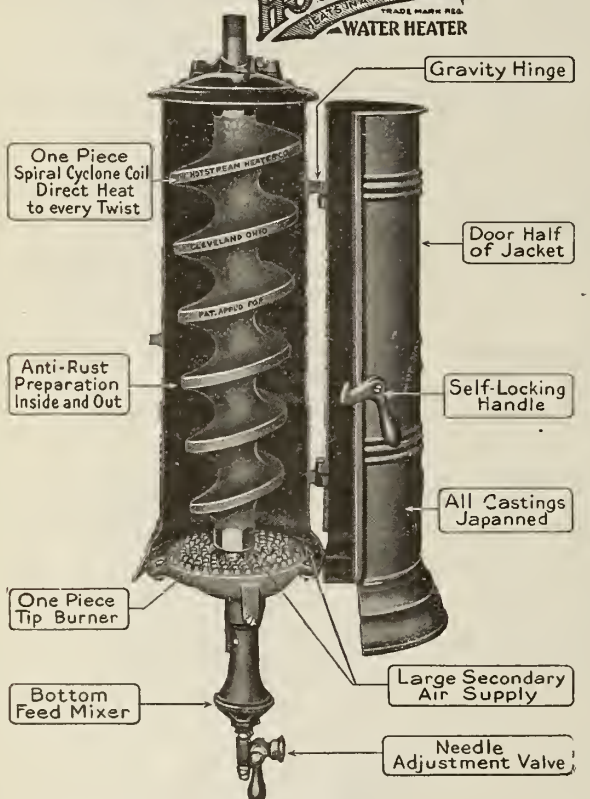
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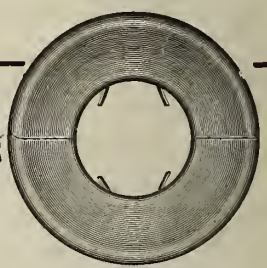


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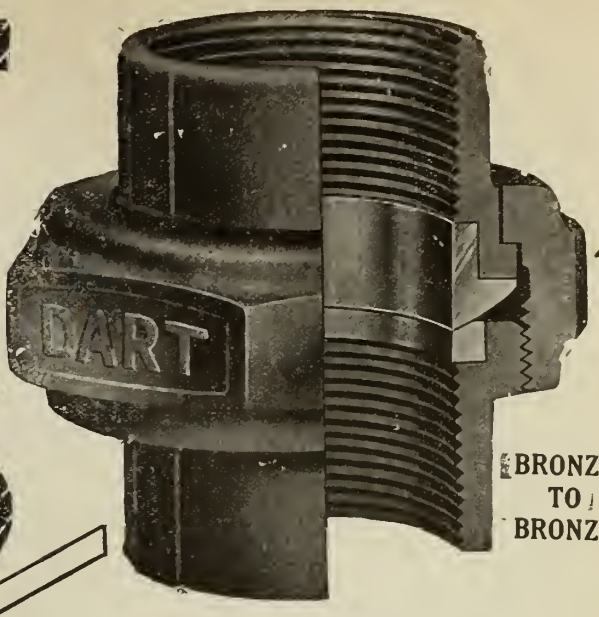
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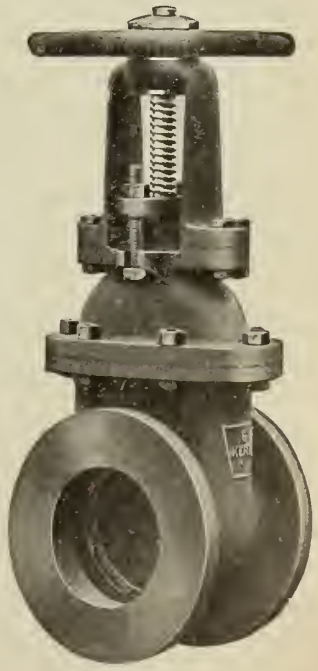
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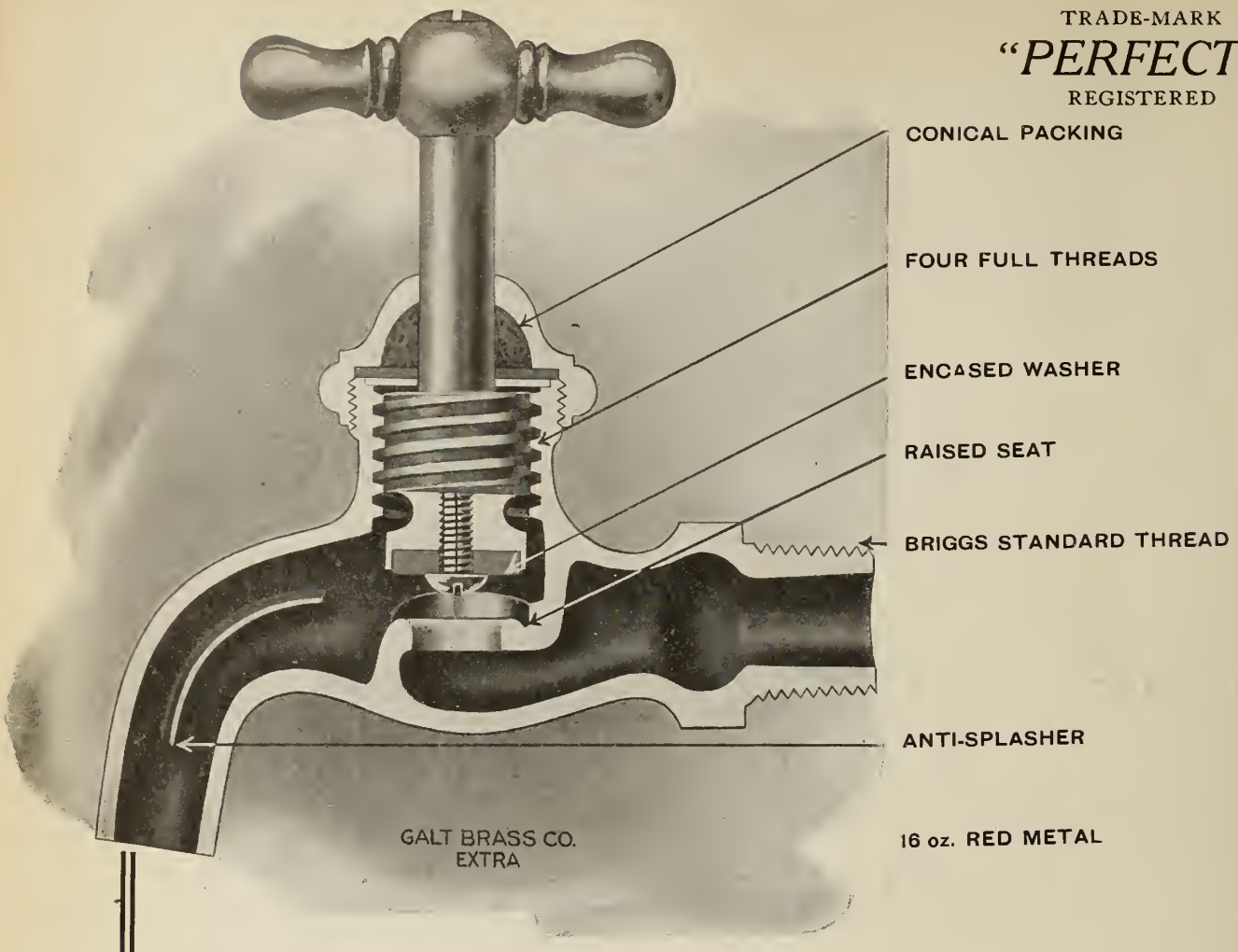
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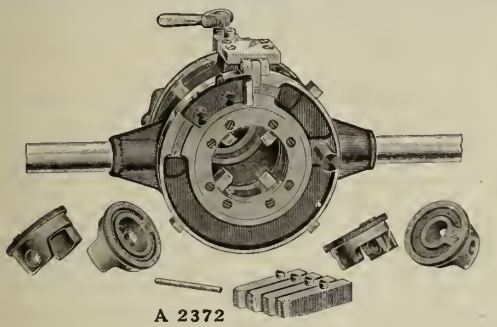
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THE SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, FEBRUARY 1, 1917 | No. 3

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A 2372



A 2363

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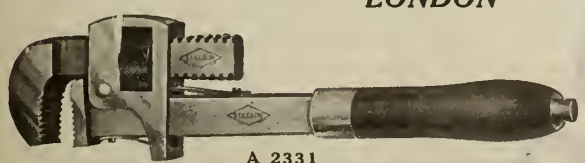


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A 2331



A 2335

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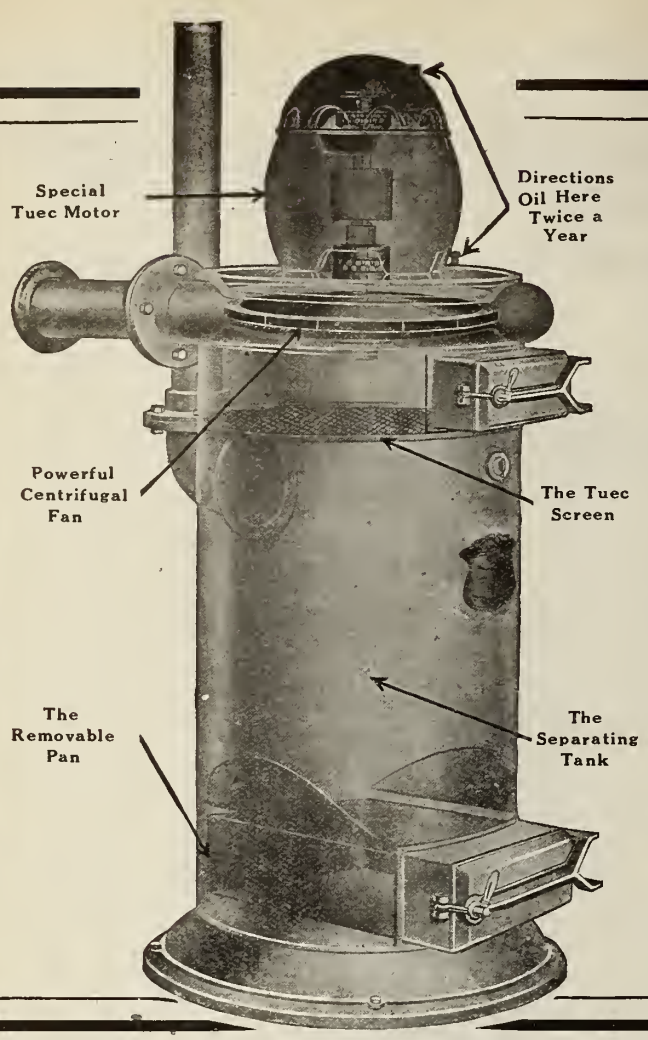
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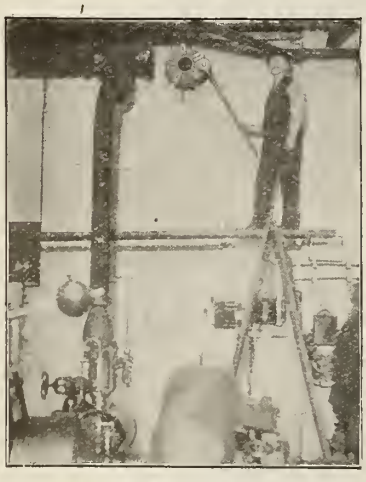
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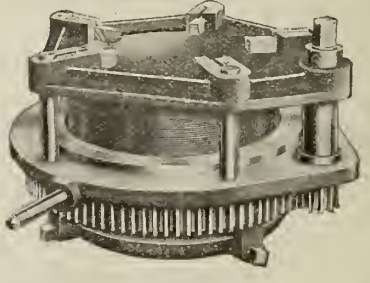
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They are made in Canada. One man does the work of two.

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This tool does the work that formerly required a heavy power machine.

One man can easily thread an 8" pipe.

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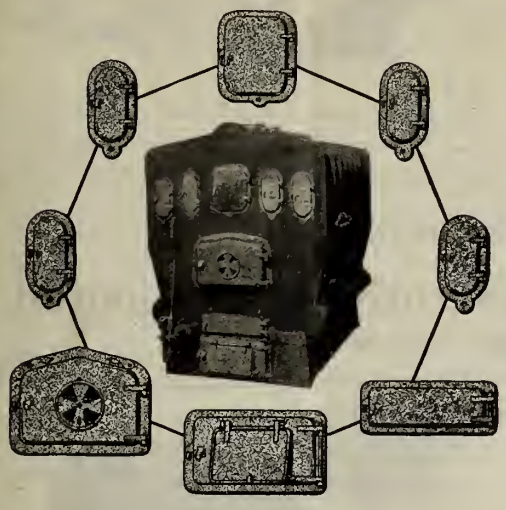
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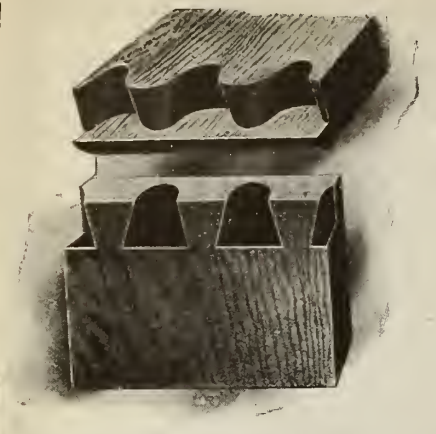
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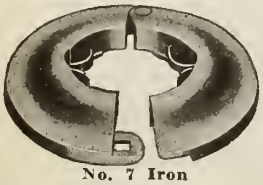
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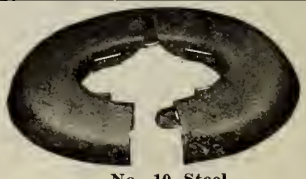
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Canadian Morehead Manufacturing Co.

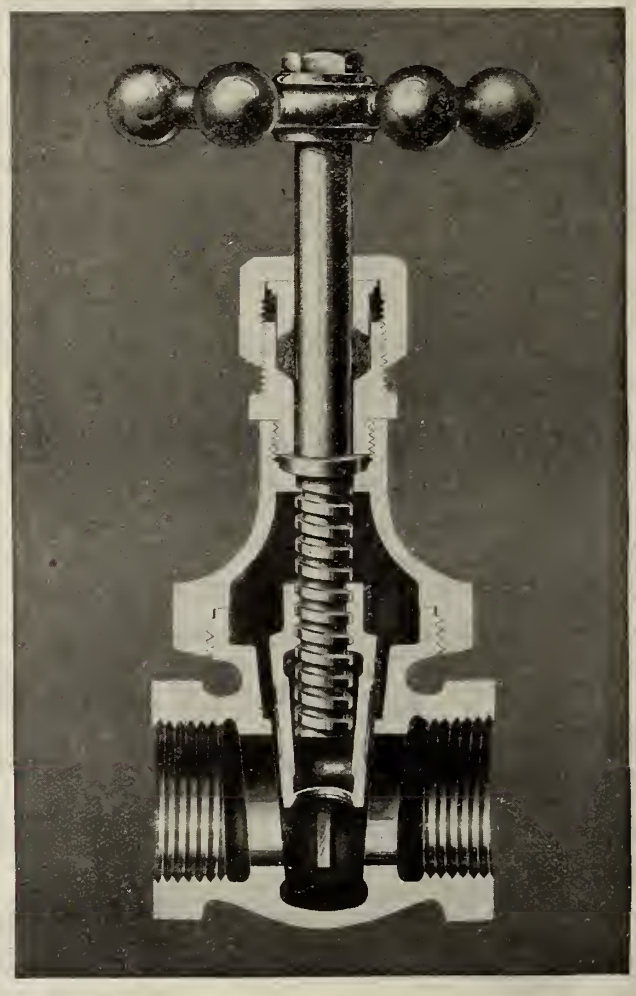
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SANITARY ENGINEER

PLUMBER AND STEAMFITTER OF CANADA

Official Organ of the Sanitary and Heating Trade

Vol. XI. TORONTO, FEBRUARY 1, 1917 No. 3

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EDITORIALS

Have You Taken Stock Yet?—Toronto Society Reports—Editorial Briefs

The MacLean Publishing Co., Limited

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When the War Broke Out

THERE were thousands of people who felt that Britain was not prepared. And to a certain extent she was not. She did not anticipate trouble; she had faith in the spoken word, and governed her actions accordingly.

However, she stood for true principles, and was ready to uphold those principles to the limit of the unwritten natural law.

When VITRO Tanks Were First Introduced

THERE was much frank criticism. Old heads began to shake. Copper line tanks had been good enough, at least the best "they had ever seen," but a tank without a lining, a tank that would not open up at the joints under certain conditions could not be procured. This was all spoken in earnest, with a spirit of honest misgivings, and we had a fight on our hands for supremacy. But we have lived down this criticism. The **Vitro Tank** has outlived such misgivings, and to-day we are turning out more tanks than we ever anticipated. And to-day there are over **250,000 Vitro Tanks** holding their own.

Three things only are responsible for the success of the **Vitro:**

First, in spite of honest misgivings the **Vitro** was given a trial by the trade.

Second, we were confident that the **Vitro Tank** would make good and outlive the criticisms levelled at it.

Third, that the Vitro Tank **HAS MADE GOOD,** and will continue so to do.

We take this opportunity of thanking those who assisted us by their loyal patronage, and to those who have not yet tried the Vitro Tank, we urge them to join our big band of customers as soon as possible, and forever cease to be annoyed with Tank troubles by buying the only NO TROUBLE TANK on the market.

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This Catalogue is essentially for Plumbers' use, and the Plumber is the best judge of what will be useful. The Catalogue Department will welcome the assistance of the Plumbers or others who may be interested, and would be glad if they would send suggestions or information regarding those little points which seem to have been overlooked in past issues and which if incorporated in the new Catalogue would be helpful in the installation of their work.

Write the "Catalogue Department" at Port Hope, telling them what you would like to have in the roughing-in book and your suggestions will be received with thanks and printed with pleasure.

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THE SANITARY ENGINEER

VOL. XI FEBRUARY 1, 1917 No. 3

The Cost of Doing Business

Nothing Mysterious About the Subject—Only Requires a Little Thought — More Co-operation Between Employer and Employee Would Result in Mutual Benefits to All—Good Practice to Find Out Each Day's Cost of Doing business

BY ONE OF US.

ARTICLE V.

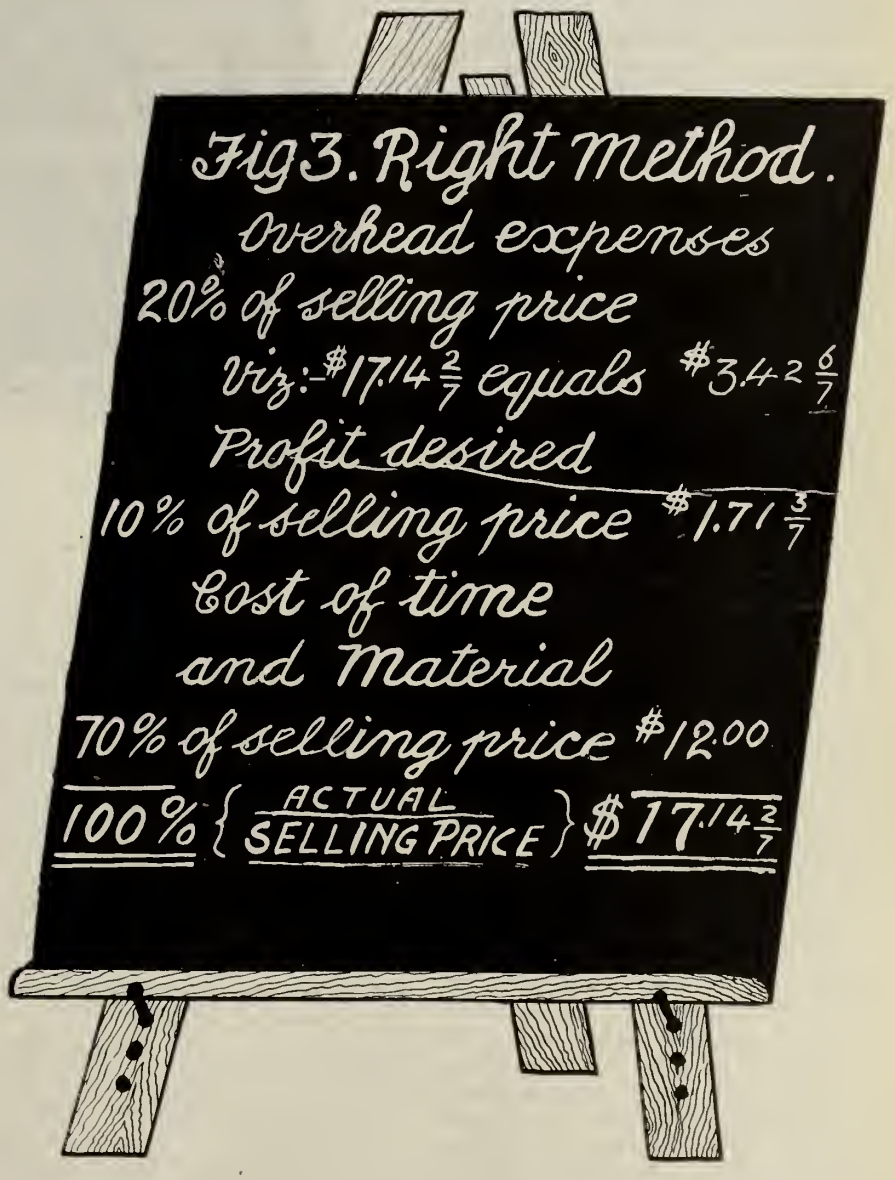
A READER of the SANITARY ENGINEER who by the way is very much interested in this series of articles, takes up another phase of the question on the cost of doing business. He says: "Mr. Editor, I quite agree with you in many things you say and in every respect with the spirit of your arguments about O.H.X., and cost of doing business, but how would you deal with this phase? I am overloaded with stock, and I know of a fellow-craftsman who is not. He wants about $250 worth of goods and I have them. The price of these goods has advanced since I bought them, and I would have to pay $300 in round figures for the goods now. Remember, I am overstocked, and I've little or no work in that will absorb all the stock.

"My overhead and profit on previous years has amounted to a total of $5,200 and works out at 20 per cent. overhead with 10 per cent. profit.

"If I hold to my figures, Mr. Editor, I will have to charge this man the sum of $357.14, and I can use ready cash right now to good advantage, but this man can get these goods from the jobber for $300. Shall I miss this sale, or shall I pull in $300 of money and hereby be at least $50 out of pocket for an indefinite period? To tell you the truth, I sold the goods for the $300, but I'd like to know from you what position I stand in, re good or bad business practice."

No doubt the above query opens up another phase not very often discussed, or even though about, but which at this stage in the articles will prove very interesting, though we do not have to depart from the simple principles laid down in previous articles.

We must never forget that while certain principles must of necessity be laid down if we purpose conducting a business successfully, there will always be cases crop up requiring special thought, and this special thinking will very often result in finer and better principles being laid down.



Business morals to-day are on a much higher plane than ever before and will, we hope, continue to improve.

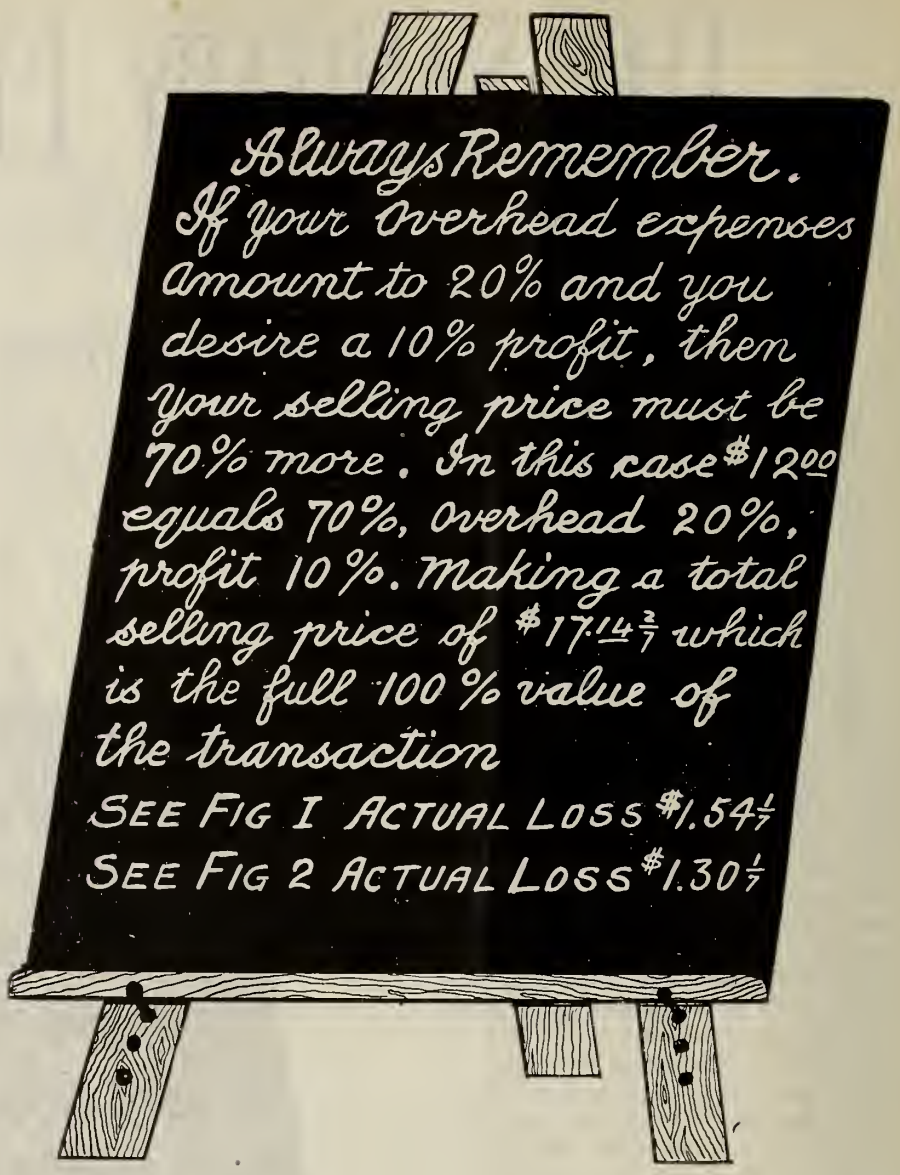
Here we have a sanitary engineer who is overstocked, he bought at "lower than present day market prices." He re-

quires ready money, and has an opportunity to turn his stock into money quickly; what value is this ready money to him? Evidently it is worth more than face value, because he can use it. Use it what for? For the purpose of possibly making another $100, or at least more than if he keeps the goods until he can dispose of them through the ordinary channels of his everyday business.

But, there is another point not to be overlooked. It will be noted that this man's business cost him $5,200 per year overhead expenses and profit; this amounts to $100 per week and let us suppose his working hours are 50 hours per week; that proves his business must in some way or other provide exactly $2 per hour every working hour in the year, one day with another. Very well; he wants money; he has the "overstock" and in a few hours, or even a few minutes, he is able to make $50 over invoice cost. By all means, we would say, "sell the goods" and prove that the transaction is a paying one in this way. The circumstances are to some extent exceptional, and the business costs $2 per hour, $20 per day to run it, and a chance presents itself to make $50, or shall we rather say, convert a certain stock of goods into ready cash in one or two hours. It will be seen that the difference between the sum paid, $250, and the offer of cash is $50, equal to two and one-half days overhead and profit cost on the whole business. Then there is the fact that the money can be used to a further, or greater present advantage than the goods can.

This phase of one's business could be taken advantage of to a greater extent if every employer could see his way clear to co-operate more with his employees, by showing them that before he the employer can actually make any profit, a certain sum per day, not per month, 3 months or year, but per hour or day, MUST be earned by the labor or material sold. One reason why we have so many young fellows starting up on their own account, lacking the necessary business training, is largely due to the fact that their employers have not taken them more into their confidence.

In actual fact this should not be the case with sanitary and heating engineers. Why? Because we have one large firm of manufacturers of goods used by us that have done more by co-operation than any other concern on this continent. We refer to the Crane Co., Chicago. Somewhere about the year 1855, Richard Teller Crane, the founder, started a small brass shop, made valves, etc., and as time went on he co-operated more and more with his employees, took them into his confidence, started some profit-sharing scheme which resulted in periodical bonuses being granted, and the last record we have was that in the Christmas week of 1915, the bonus granted amounted to 10 per cent. of the total salaries paid each one of the employees during that year. The wage bill amounted to seven and one-half million dollars, therefore the bonus paid that Christmas amounted to $750,000; all due to co-operation, and taking the employee into one's confidence.



There are some sanitary engineers in business who do take their employees into their confidence, which is proved by a little incident that took place recently in the presence of the writer.

A fitter was using a 4-foot Stillson wrench on a fitting, when in some way or other the jaw broke and a piece of it flew several feet into a w.c. bowl, of course destroying the bowl. It was just about quitting time for the noon meal and the fitter remarked that the boss had a certain "loss" right there, naming the amount, which, within a few cents, covered the cost of the bowl, plus "cost of doing business and the total cost of a new jaw, less 10 per cent. previously charged for depreciation. It was pleasing to note that even one single workman took a little more than the usual amount of interest in his employer's business, but it only proved that this employer was one out of the ordinary.

(Continued in next issue).

REORGANIZATION

The heating trade in Canada will be interested to know the Waldon Co., of Spencer boiler fame have been reorganized, and will now be known as The Spencer Heater Company of Canada, Limited. Their late address under the name of Waldon Company was Lumsden Buildings, and the new address is 68 Adelaide St., East, Toronto. A splendid show room is being fitted up, and with their newly equipped factory at Penetanguishene, the trade can be assured of prompt deliveries.

Central Heating and Power Plant, University of Toronto

By L. M. Arkley, M. Can. Soc, C.E.

The operation of central heating plants for the supply and distribution of heat over comparatively large areas has been successfully accomplished in certain instances by progressive municipalities. The private installation of such systems, however, is somewhat infrequent, due probably to absence of opportunity. Such an enterprise as that featured in the present article possesses exceptional interest not only because of magnitude and distances involved, but because of the consistent results which are justifying the wisdom of the undertaking.

Efficiency Test of Boiler Plant

The object of the test was to find the efficiency of the boiler plant under actual working conditions. While the boilers were cleaned shortly before the test, there was no special preparation made to insure anything but a normal efficiency.

The test was conducted by the writer assisted by J. D. Thompson, Demonstrator in Mechanical Engineering, and the members of the 1916 graduating class. A. D. LePan, Joint Superintendent, and W. H. Bonus, of the Superintendent's office, gave every assistance in preparing for the test. The operation of the plant was under the direction of C. Moseley. The accompanying table embodies in its detail the various factors entering into the test, together with the obtained results.

As will be observed from these results, the plant possesses ample capacity for all heating requirements and, being connected to local supply sources, occasional demands for lighting current in excess of the plant capacity in operation can be instantly met without having to force the boilers or start up additional generators. These conditions enable the plant to be run at a fairly steady load with no sudden or unexpected variations so that conditions of at least as great or perhaps greater efficiency than those indicated by the test results are doubtless constantly maintained under regular operation.

Operating Data

The cost of production for three successive seasons from 1912-13 are tabulated below, as well as tables showing the amount of coal used and the temperatures obtaining during the different months of these seasons:—

COAL USED.

Aver. daily consmptn.	1912-13 tons	1913-14 tons	1914-15 tons
Sept. 25-Oct. 31	17.0	14.2	13.2
November	36.5	31.4	29.1
December	49.0	35.7	41.5
January	43.8	46.0	44.5
February	58.2	57.4	44.9
March	42.8	37.6	38.6
April	23.6	24.2	18.6
May	10.1	10.1	7.0
Total consumption.	8.584	7.760	7.146

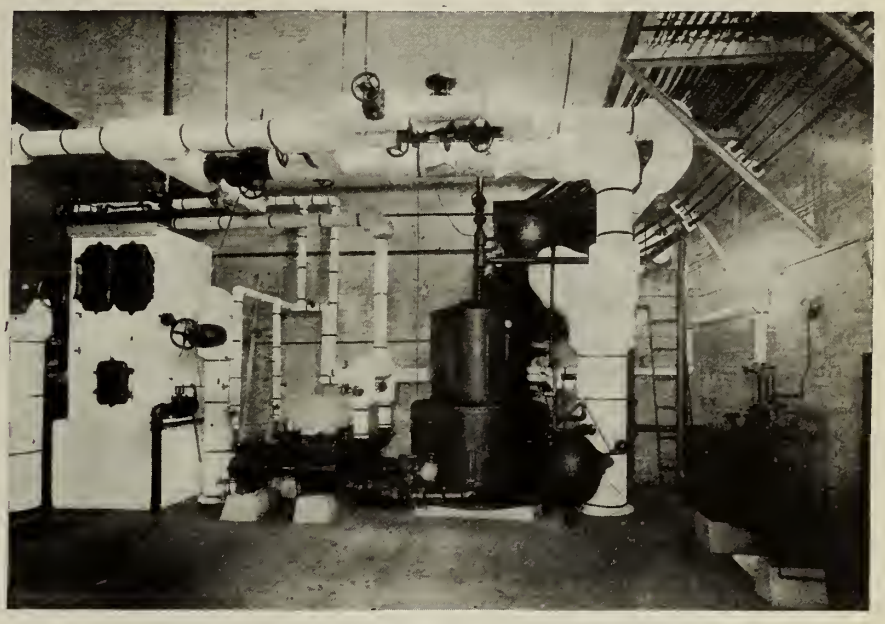


FIG. 13—AUXILIARY EQUIPMENT IN ENGINE ROOM.

COST OF PRODUCTION.

	1912-13 Total cost	1912-13 Cost per sq. ft. radiation in cents	1913-14 Total cost	1913-14 Cost per sq. ft. radiation in cents	1914-15 Total cost	1914-15 Cost per sq. ft. radiation in cents
Cost of coal	$29,429.52	17.23	$26,649.23	15.12	$25,135.64	12.80
Cost of city water	510.62	.30	265.90	.15	209.00	.11
Repairs and renewals	2,393.39	1.41	3,674.89	2.08	5,354.06	2.73
Salaries (Engineers, Firemen, Helpers).	8,713.81	5.12	7,992.47	4.54	7,972.25	4.05
Elec. cur. purchased	1,100.66	.65	1,424.24	.81	1,329.32	.66
Total cost of operat'n	$42,148.00	24.71	$40,006.73	22.70	$40,000.37	20.35
Additional Data—						
Total sq. ft. radiation		170,221		176,203		196,534
Total current generated (Kw. hrs.)		395,395		351,231		390,655
Total water evaporated		112,329,664 lbs.		121,657,911 lbs.		117,424,163 lbs.
Total cost of coal required for evaporating 1,000 lbs. of water under observed conditions		26.2 cents		21.9 cents		21.4 cents
Cost of evaporation per 1,000 lbs. steam		38 cents		33 cents		34 cents

Note:—1—The increased charge on repairs and renewals is accounted for by extensive alterations which have ultimately reduced the cost of operation.

2—In this distribution of cost no charge is made for light and power or high pressure service.

TEMPERATURES.

On a Basis of Average Taken from 1840 to 1898.

	1912-13. Degrees	1913-14. Degrees	1914-15. Degrees
October	50.6–4.05 above aver.	51.6–5.1 above aver.	52.75–6.20 above aver.
November	40.5–4.54 "	42.2–6.3 "	38.13–2.17 "
December	32.6–6.41 "	32.4–7.2 "	25.72–0.47 "
January	31.3–0.45 "	25.5–3.7 "	23.62–1.77 "
February	20.4–1.77 below aver.	15.5–6.7 below aver.	26.04–3.87 "
March	33.3–4.61 above aver.	30.8–2.1 above aver.	29.93–1.24 "
April	46.3–5.13 "	41.5–0.3 "	49.82–8.65 "
May	54.3–1.90 "	58.5–6.1 "	52.15–0.30 below aver.
Yearly average	4.29 "	3.85 "	2.89 above aver.

1—Name of Plant	University of Toronto Heating and Lighting Plant
2—Number and kinds of boilers	Five Babcock and Wilcox water tube
3—Kind of furnace	Murphy Automatic
4—Grate Surface—Inclined grates—	
Projected area	328 sq. ft.
Actual area	454 sq. ft.
5—Heating surface— Total	21,264 sq. ft.
8—Date	Jan. 17th, 1916
9—Duration	11 hours

Average Pressures, Temperature, Etc.

10—Kind and size of coal	Vinton, Slack
11—Steam pressure by gauge	153 lbs. per sq. inch
12—Steam pressure absolute	167.6 lbs. per sq. inch
13—Temperature of feed water entering boiler	173° F.
14—Temperature of escaping gas leaving boiler	487° F.
15—Force of draft between damper and boiler	0.4" water
(a)—Draft in furnace	0.16
16—State of weather	Fair and cold (10° above zero)
17—Percentage of moisture in steam	1.5%
18—Factor of correction for quality of steam	98.5%
19—Total coal as fired	67,900 lbs.
19a—Total siftings weighed back and credited to furnace	6,130 lbs.
19b—Total net coal as fired	61,770 lbs.
20—Percentage of moisture in coal as fired	3.51%
21—Total weight of dry coal fired	59,600 lbs.
22—Total ash, clinkers and refuse (dry)	5,372 lbs.
23—Total combustible burned	54,228 lbs.
24—Percentage of ash and refuse in dry coal	9%
25—Total weight of water fed to boiler	563,720 lbs.
26—Total weight of water evaporated corrected for quality of steam	555,250 lbs.
27—Factor of evaporation	1,088
28—Total equivalent evaporation from and at 212° F. corrected for quality of steam	604,112 lbs.

Average Hourly Quantities and Rates.

29—Dry coal per hour	5,418 lbs.
30—Dry coal per sq. ft. of grate surface per hr.	11.93 lbs.
31—Water evaporated per hr. corrected for quality of steam	50,477 lbs.
32—Equivalent evaporation per hr. from and at 212° F. corrected for quality	54,919 lbs.
33—Equivalent evaporation per hr. from and at 212° F. per sq .ft. of heating surface	2.58 lbs.

Capacity.

34—Boiler horse-power developed (average)	1,592
35—Rated capacity per hr. (10 sq. ft. H.S. per boiler H.P.)	2,126
36—Percentage of rated horse-power developed	74.9%

Economy.

37—Water fed per pound of coal as fired	9.12
38—Water evaporated per lb. of dry coal	9.31
39—Equivalent evaporation from and at 212° per lb. of coal as fired	9.78
40—Equivalent evaporation from and at 212° per lb. of dry coal	10.14
41—Equivalent evaporation from and at 212° per lb. of combustible	11.14

Efficiency.

42—Calorific value of 1 lb. of dry coal by calorimeter	14,800 B.T.U.
43—Calorific value of 1 lb. of combustible by calorimeter	15,800 B.T.U.
44—Efficiency of boiler furnace and grate	66.5%
45—Efficiency based on combustible	68.3%
46—Cost of coal per ton of 2,000 lbs. delivered in boiler room	$3.525
47—Cost of coal required for the evaporation of 1,000 lbs. of water under observed conditions	19.3c
48—Cost of coal required for evaporating 1,000 lbs. of water from and at 212° F.	18.02c
49—Note on smoke: Very little smoke noticeable during test.	

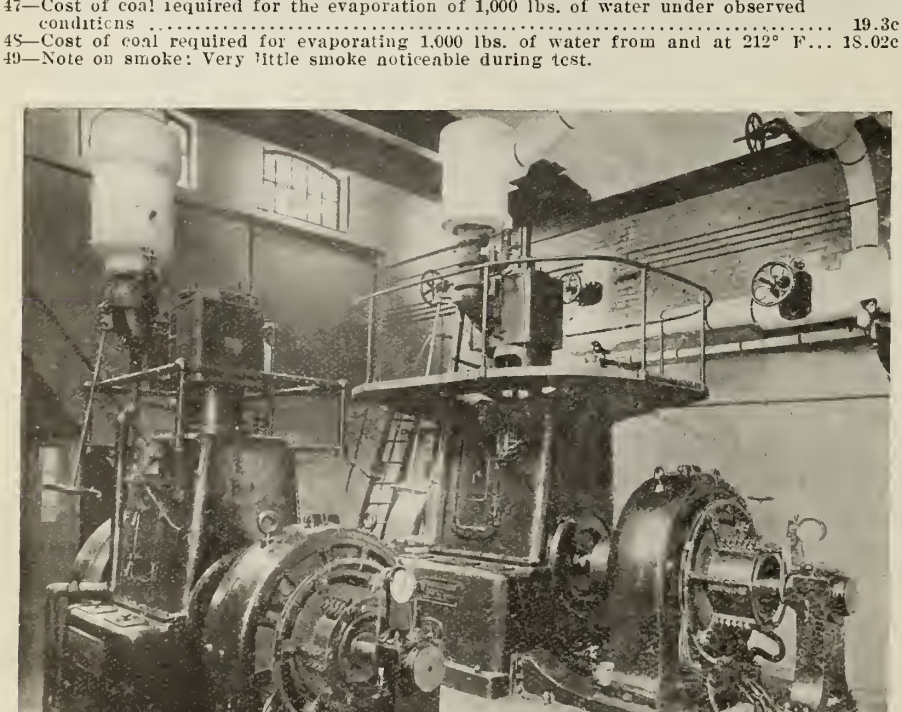


FIG. 12.—ROBB-ARMSTRONG ENGINES AND WESTINGHOUSE GENERATORS.

51—Analysis of chimney gases—	Average.
Co_2	9.7
O	10.1
C O	0.1
N by difference	80.1

52—Proximate analysis of coal—	Per cent.
(a) Moisture	0.465
(b) Volatile matter	21,467
(c) Fixed carbon	71,358
(d) Ash	6,710
(e) Sulphur separately determined	2.00

NEGLECTS THE PLUMBING

Mr. M. J. Wright who collects the rent from Mrs. Carrothers' tenant at 272 Sherbourne street, Toronto, was charged in the court recently with neglecting to put the plumbing in the house in proper condition. After hearing the evidence of the tenants the magistrate asked the accused if he would make the repairs as he did not like to make him pay a fine and do the work also.

"I do not think I am liable," said the accused.

"Alright it will be ten dollars and a half costs," said the magistrate.

Writes Abominable Letters

When called into court a week later to answer to a charge of allowing defective plumbing to exist at the above named premises, Magistrate Kingsford sent for the Crown Attorney.

"This man I believe," he said, "has written some abominable letters to the tenant of the house but the Health Department cannot prove it. I fined him a week ago for his offence. He has defied the Department and refused to make the repairs."

The accused stated that he had a man doing the work. A week ago he said he was not liable for the condition existing. He seemed to be in a more amiable frame of mind and the case was adjourned a week to give him a chance to complete the work.

Proves Need for Annual Inspection

The above items of news recently appeared in Toronto papers, and go to prove that if there were annual inspections made, and the owners given to understand that they are liable for the sanitary condition of a house, or building, not only would the tenant be protected, but the owner would be informed when plumbing fixtures were not in a good state of repair. This would be very valuable information to owners, because 90 per cent. of the repairs made, could be effected at very much less cost if attended to in good time. Many times such repairs are made necessary by careless tenants. If it could be proved that certain tenants were responsible in time, and the owners were told of the trouble the owner would be able to notify his tenant of the fact.

Further, the very fact of the people knowing that annual inspections of plumbing were in operation, could not fail to have a good effect upon both tenant and owner or his agent.

Toronto Sanitary Annual Reports

A Splendid Year's Work—Great Progress Made in Every Department—Greater Efficiency is the Promising Outlook—Splendid Reports Submitted by Each Chairman

THERE is nothing like getting down to business as early in the year as possible, and making plans for the year's work. This was what the above society did a few days ago in an endeavor to start the year right. The following reports are, without doubt, very interesting. Full of proofs that the members have not let the grass grow under their feet.

PRESIDENT'S REPORT 1917.

To the Members of the Toronto Society of Domestic Sanitary and Heating Engineers.

Brother Members:—At the commencement of this year of 1917 I would congratulate the members of this Society on the fact that we are still organized and in a position to do business when we consider the fact that our country for 2½ years has been engaged in the most devastating war ever known when societies, associations and business houses have been swept out of existence. The different chairmen's reports will have shown the amount of work which your officers have had before them during the past year. I will only touch upon a few of the more important items.

The agreement entered into with our workmen I believe was a good thing for our members and the whole profession in Toronto, it not only insured industrial peace but brought two branches of the trade into a working arrangement.

We are at present trying to establish a better understanding between the members of our profession and the manufacturers and supply houses, regarding discounts and credits. We believe our case is honest and straightforward, we want nothing but what is right and equitable, we want nothing but ordinary trade protection, with sufficient recompense for cash or prompt settlements of account.

Why should supply houses give all manner of credit to irresponsible persons who are continually creating bad business conditions? These men who lack business training, procure goods, do not pay their accounts, and those who do pay their accounts are the sufferers. The supply house or manufacturer must provide for these losses. It is to be hoped that the day is not far distant when persons procuring merchandise, will be held strictly to account for its value and be subject to fine or imprisonment in default.

Let me conclude by asking that each and every member of this society will pay strict attention to his credits, collections and overhead expenses. Refraining at all times from the evil of price cutting.

I also wish to thank the officers and committees that have worked with me this past year for the attention and time they have given to the affairs of this Society. Wishing you all a happy and prosperous New Year, I am Yours fraternally, F. H. Gentle.

SECRETARY'S REPORT FOR 1917.

To the Toronto Society of D. S. & H. E. Mr. President; Officers and Members.

Twelve months has elapsed since I assumed the duties of Secretary, and I make bold to say that the present satisfactory condition of the Society's affairs is to no small extent due to the fact that a permanent official was appointed at your last annual meeting to look after the welfare of the Society. Whether or no, the present incumbent of the office is the most suitable person is for you to say, but whatever be your decision in the matter, I make a strong plea to you not to discontinue a permanent Secretary, as it is the most essential means whereby the members are assured of ultimate success in the endeavours of our Society.

I only wish to repeat what I said in my report after one and a half months in office, which was that our Secretary is only "one", and he becomes no more valuable to the individual member than to the extent that the individual member makes use of him, has confidence in him, and co-operates with him in all matters that affect the Society and the interests of the member as well. Critize me and my methods to myself, help me with suggestions that you think would improve matters, and what is most important of all, do your bit, and do not expect to receive any more in return than you are willing to give.

The purchasing idea as carried out during the past year has more than proved itself successful, and is an instance of possibilities that exist among us, and that only await the individual co-operation of the members, to the end of our assuming some importance to the supply interests of our business.

In addition to my duties as Secretary of the Society, I have also acted as Secretary of the Examining Board for Plumbers at the City Hall, and I only wish to say that to this Board, the thanks of the entire craft is due, for the future welfare of the trade in Toronto is alone depending on the actions of the Board in assuring to the public, safe and capable plumbers to whom are entrusted the sanitary conditions of our homes.

Another step in this direction, is the Joint Examining Board of Plumbers and Steamfitters Apprentices, of which I am also Secretary, and to whom we must need look for future efficiency on the part of the mechanics in the days to come. This Board have compiled the needful examination papers, holding repeated meetings in our rooms until they had accumulated the required data until now, every detail that the years to come might need to carry on this work has been taken care of. At the several Boards of Trial already held, the boys examined have shown a marked adaptability to the trades they are engaged in, and up to date, all the applicants have been successful in their examination, so much so, that the members of the Board are commencing to plan ways and means to bring some of the present journeymen as well as licensed employers before them for instruction let alone examination.

Gentlemen, let me repeat to you the purposes and objects for which our Society secured papers of incorporation, and if you will just digest them for what they really stand, you cannot but realize that we are in our rights to aspire to the greatest heights possible to avail, so that we may, as a craft be both honored and respected in our community.

"With a view to promoting the business of heating and sanitation to organize those persons who are qualified therein in order to allow these trades to insure a standard of efficiency for the protection of the public and for the persons engaged in such businesses."

Just think what those words stand for gentlemen, and you must agree with me that anything we desire is ours for the asking. Wake up all of you, and let us have our share of this world's

goods, before it is too late to avail ourselves of the opportunity awaiting us.

Team work is what I would suggest for our members, let us pair the members into teams, each responsible for the other, where the Society comes into such co-operation there can only be one result for all concerned. Pick your mate for the year to-night, work with him, consult with him, buy with him, do anything and everything with him, it will mean success for you, and a success for the Society, and what is more, result is economy for all concerned.

I also wish to suggest that the Executive Committee be elected as chairmen of the different committees as provided for in the constitution, and not as a joint body as in the past. By this method, you will select men capable to look after the duties entailed on the committees provided for.

I wish to draw your attention to the fact that we have eight of our members who have enlisted in this great struggle that is at the present time over-riding all other affairs of this and the mother country. Also to my knowledge, have the sons of two other members gone forth in this fight for right against Prussianism.

With one exception I believe those who represent us have to this date escaped without injury, the one case that I know of being the son of Walter Boddington who has received a painful wound in the knee from shrapnel.

Eleven new members were added to our roster during the year, and I believe that without exception they are the equal of any of our previous members.

About two thousand pieces of mail matter was handled during the year, which, in itself was no small undertaking.

The foregoing will show you the need of a secretary, and while there are many other items of interest that I could mention, knowing that the other officers and chairmen of committees have touched on the numerous items that the Society have continually before them.

Thanking you for the support in the past, and wishing you one and all unbounded prosperity from the depth of my heart in the future, I remain Yours respectfully, Garrett F. Frankland, Secretary.

SECRETARY'S REPORT ON FINANCES, ENDING DEC. 30TH, 1916.

To the Officers and Members of the Toronto Society of D.S. & H.E.

Gentlemen:—

In conjunction with the attached Statement of Receipts and Disbursements for 1916, I beg to place before you the following items, which to a great extent explain the actual condition of affairs as existing at the termination of the year 1916, as regards our financial standing.

Our total receipts show an amount of	$1,590.39
Our total disbursements were	1,566.67
Leaving us a balance on hand at Dec. 30th, 1916	23.72

While the above figures show a balance on hand, do not misunderstand that to mean that we met all our obligations, because we did not, as I will show you, and at the same time show that while we had the assets to more than cover the amount of bills payable, it was only because we were unable to realize on the dues outstanding and collectable, that we have to necessarily show a deficit on the actual business conducted for the year.

Bills Due and Unpaid

Secretary's salary (Oct. 28 to Dec. 30)	$180.00
December expenses	23.70
Delegates expenses	33.00
Electric light	1.00
Caretaker's and elevator man's Xmas box	2.00
Total liabilities	$239.70
Bal. on hand as per statement	$ 23.72
Dues recv'ble, spec. ass'mts., 1916	75.00
Dues for 1916	110.00
Dues for 1915	50.00
Total	$258.72
Balance possible	19.02
Or if we pay no attention to dues receivable, we stand to the bad for 1916.	$215.98

Our other assets list up as follows:

Cupbord	$ 11.75
Chairs	23.50
Table	6.00
Typewriter	60.00
Black Board	3.00
25 estimates books at $1.00 each	25.00
75 price books at $2.00 each	150.00
Pictures, frames and office fixings	20.00
Office supplies, stationery, etc.	15.00
Books of library and records	25.00
Baseball outfits, and quoits	25.00
Fixture (a)	7.50
Total	$371.75

All of which I submit for your consideration,
Yours respectfully,
SECRETARY.

August	119.75
September	80.00
October	137.16
November	55.00
December	60.00
	$1,590.39

Expenditures.

January	$ 193.01
February	83.75
March	139.34
April	159.93
May	120.90
June	315.75
July	122.95
August	62.65
September	102.35
October	165.80
November	62.99
December	37.25
	$1,566.67
Receipts	$1,590.39
Expenses	1,566.67
Balance Dec. 31, 1916	$ 23.72

Respectfully submitted,
THOS. MAXWELL.

CONDENSED REPORT OF THE COMMITTEE OF TORONTO SOC. D. S. & H. E. FOR THE YEAR 1916.

At the beginning of 1916, the sanitary committee decided to take up all the grievances between the Master-Plumbers and Chief Plumbing Inspectors. Each Master-Plumber was to leave his grievance with our Secretary, and the committee then took it up with the plumbing department. The chief inspector promised to keep us informed when any changes in the by-law took place. They also advised us to call up the department when in doubt as to what would be accepted by the inspector. This saved many a dollar and much trouble between plumber and customer.

Many complaints have come in from the different members and have been

STATEMENT OF FINANCES, 1916—TORONTO SOCIETY OF D.S. & H.E.

RECEIPTS

Month	Arrears	Init. Fees	1916 Dues	1916 S.A.	Specials	Totals
Dec. 31, 1915	$124.00	.....	.....	.....	.....	$ 124.14
January, 1916	90.00	.....	55.00	.....	.....	145.00
February	55.00	.....	155.00	.....	.....	210.00
March	50.00	.....	122.84	.....	.....	172.84
April	25.00	.....	130.00	.....	Es. Bk. 1.50	156.50
May	.....	.....	125.00	.....	.....	125.00
June	50.00	.....	60.00	.....	.....	110.00
July	.....	.....	95.00	.....	.....	95.00
August	.....	.....	20.00	50.00	.....	70.00
September	.....	.....	25.00	55.00	Entr. F'ds. 54.75	134.75
October	20.00	.....	32.16	80.00	.....	132.16
November	.....	20.00	5.00	30.00	.....	55.00
December	20.00	.....	25.00	15.00	.....	60.00
Totals	$434.14	$20.00	$850.00	$230.00	$56.25	$1,590.39

DISBURSEMENTS

Month	Salary	Rent	Light	Phone	Print'g	Ofc. Ex.	Specials	Totals
January	$100.00	$ 22.50	.....	.....	$18.00	$19.45	$ 30.00	$ 189.95
February	40.00	15.00	1.50	13.00	15.75	1.56	.....	86.81
March	120.00	15.00	.....	.....	6.75	17.00	22.84	181.59
April	80.00	22.50	1.53	.....	3.25	7.60	2.80	117.68
May	80.00	15.00	.....	13.00	2.25	10.65	..... 25.00)	120.90
June	80.00	15.00	1.50	.....	2.75	3.00	190.00)	317.25
July	80.00	15.00	.....	13.00	5.75	7.70	.....	121.45
August	40.00	15.00	.....	.....	2.00	5.65	.....	62.65
September	120.00	15.00	2.25	.....	....	5.10	.....	142.35
October	80.00	30.00	.....	13.00	....	2.80	.....	125.80
November	40.00	15.00	.....	.....	....	7.99	.....	62.99
December	.....	15.00	1.50	.....	14.75	6.00	.....	37.25
	$860.00	$210.00	$8.28	$52.00	$71.25	$94.50	$270.64	$1,566.67
Balance								$ 23.72

TREASURER'S REPORT, 1916.

Toronto Society of D.S. and H.E.
Receipts.

Jan. 1st—Balance on hand	$ 124.14
Jan. 1st—Receipts	145.00
February	165.00
March	217.84.
April	156.50
May	125.00
June	120.00
July	95.00

treated with great caution, and in every case an agreement has been settled upon. We are always glad to have the members give us a chance to help them along these lines. One complaint that came from the Commissioner of Police, shows how some of the Master-plumbers were getting applications and taking them to their place of business:—then, when the police called, they were shown the application instead of the License.

The Local Board of Health, at their meeting on February the 16th, by resolution of its chairman, Alderman Risk, made a recommendation unto the Board of Control, asking for a transfer of the Plumbing Department over to the City Architect's Department, which was defeated. So is he. There was a Bill, No. 64 of 1916, before the Ontario Legislative Assembly, which had its second and third reading, March 3 and 13 and April 20, to make it possible to create a Provincial Code. Therefore the Act is to amend the Public Health Act, which is now in force throughout the Province.

In reference to the enforcing of our plumbing code, parts of which are not carried out:—

Under Sections 63, 67, 68, 69, 65, and 66. The committee is still working on same, with a feeling that we will yet accomplish something.

We took up the question of the examinations and of the licensing of master-plumbers, and had the examination tests more up-to-date and practical. In 1913 there were 504 licenses issued, that was the year when everybody who applied got a license. Then, when the licenses by examination came in, things were changed, for at the end of 1916 only 343 were licensed; showing a decrease of 161.

In January we had an appointment with the Chief Plumbing Inspector, and interviewed Dr. Nasmith and Association of the City Laboratories, and Mr. Storey of the Filtration plant, to discuss the problem we are confronted with, namely, Chloride of Lime.

We took same up with these gentlemen, demonstrating our grievances by showing condition of piping, waterfronts, domestic heaters and rubbers of all kinds at their different stages; leaving above outfit with them for further consideration. They have asked for a collection of different maker's rubbers, etc., so they might test same, to see which would stand conditions best.

Before we received the different rubbers to put under the test, a complaint came in from our City Works' Department. A piece of 10 in. water main that had been taken out by the works, and which we have been fortunate enough to secure was sent into our city laboratory so clogged with this deposit of lime, that you can hardly get your hand into it. The Good Mfg. Co., and the Canadian Wolverine Co., supplied us with rubbers for testing, and these were placed in the "treated water" and in what we term "raw water," in baskets with the different metals. After a six-month' test, the following report was submitted to us.

> "When the two cages were taken up and the contents examined, there was no particular difference between the two. Neither the chlorinated nor the unchlorinated rubber goods showed any particular deterioration. In both instances the rubber was flexible, showed no evidence of becoming brittle or honeycombed, or anything of that kind. The feather-edge washers showed some wrinkling round the edges in both cases."

It is our intention to take up this analysis with the Provincial Laboratories, No. 5 Queen's Park, and receive another Report from them, which we know will be of interest to all the members.

We, the sanitary committee, request that our members will show their appreciation through their Secretary, by having him send a letter to the Chief Plumbing Inspecter, to the Issuer of Licenses, to Dr. Nasmith and to Edwin Newsome, Editor of THE SANITARY ENGINEER, for the courtesy and practical assistance they have given the chairman of the sanitary committee in connection with all your troubles. John Wright, Chairman of Sanitary Committee.

HEATING COMMITTEE REPORT

To the Officers and Members of the Toronto Society of D. S. & H. E.

Gentlemen:—As chairman of your heating committee, I take much pleasure in presenting to you the following report and accompanying suggestions.

From time to time throughout the past year, your heating committee has been called upon to answer communications, give advice and formulate plans for the betterment in general of the heating business. These different duties have been performed to the best of the Committee's ability.

One of the main features which has been brought to our attention, is the necessity of having a member of our Society placed upon the new board of low pressure boiler inspectors. We found that this committee was being formed for the purpose of inspecting low pressure boilers throughout the Province; and that its personnel did not include one of our members, so we took the necessary steps to bring the importance of having our society represented on this Board, to its promoters, with the very gratifying result that we have received a reply looking very favorably upon our suggestion; and at the present, we have no reason to doubt but that we will be represented.

Then another very important duty which has been thoroughly looked after, was the compiling of a set of questions and answers applying to the heating business which were to be used by our examining Board when apprentices and journeymen come up for their preliminary and final examinations. We have some 75 questions and answers for the junior set and 50 questions and answers for the senior set. We have carefully considered these questions and answers and believe that they will prove a great help towards making efficient and intelligent mechanics.

While dwelling on this subject, I wish to draw attention to the great necessity of securing and maintaining more apprentices. I am well aware of the difficulty of this task under the present national conditions; but at the same time, feel it my duty to draw the attenion of every member present to the serious hardship in store for us, if we do not make an effort to secure and keep the Boy.

I believe these remarks about cover our business for the past year and if you will permit me for a moment to push aside the few remaining dark shadows of our past, and take one little peep into the rosy dawn of our immediate future, I believe that I can see the time very near, when we will have to establish what might be termed a Clearing House for plans and specifications of heating jobs, other than those provided by intelligent architects. What I mean, is a permanent man or if necessary, a staff to thoroughly check up heating layouts before a price is submitted on them. I believe if we were to organize an office of this description, we would very soon eliminate the present curse of having every Tom, Dick and Harry prepare heating plans and specifications, which are afterwards handed to us to figure on; and otherwise generally butt-in and interfere with our business. It would also give us an opportunity to establish ourselves before the public as true heating engineers, and the people would soon learn to look for tenders and specifications with our mark of approval.

I am very much opposed to having my prospects as well as my work interfered with by employees of wholesalers, and would very strongly advocate that members of our Society cease asking advice and favors from these people. We should become more competent ourselves and instead turn to the Secretary of our Society when in any kind of difficulty.

I make these few latter remarks as suggestions owing to the fact that sev-

eral supply men and manufacturers tell me that a great number of the members of our society call upon them for approximate costs of jobs, together with specifications, plans and other general information which I claim is a great detriment to our business.

Thanking you for your kind attention, I am,

Yours very truly,
(Signed) H. G. Waterman,
Chairman of the Heating Committee.

ARBITRATION COMMITTEE

Toronto Society of D. S. & H. E.

Gentlemen,—As chairman of your Arbitration Committee for the last year, I take great pleasure in reporting that very few members seemingly in the last year have found it necessary to take advantage of this said committee; therefore, I have concluded they must have had a satisfactory and pleasant year, which is very encouraging.

Looking forward to the conditions that are liable to exist in the coming year, I feel quite satisfied this committee is going to be one of the most busy ones in our association; therefore, I would recommend great care should be taken in selecting this committee for the coming year, and would propose selecting some of our older members of the society.

Thanking you for the honor of electing me chairman of your committee for the past year, also the other members for their able assistance, I am, yours very truly, T. B. Smyth.

AUDITORS' REPORT, 1916

The Toronto Society of D. S. & H. E.

To the officers and the members of the above society.—We, your auditors for 1916, beg to submit the following report of the finances of the above society from January 1st, 1916, to December 30th, 1916:—We have examined all the books, cheques, vouchers, orders, and receipts of the secretary and treasurer, and find same to be correct.

We note with pleasure the system as adopted to be satisfactory, and have no hesitation in complimenting the treasurer and the secretary on the able way in which they have attended to the financial affairs of the society. The books were made up as follows:

Balance on hand, Jan. 1st, 1916	$ 124.14
Total receipts throughout the year	1,466.25
Total expenses throughout the year	1,566.67
Balance on hand December 30th, 1916	23.72

All of which we respectfully submit.

A. H. Read,
W. R. H. Daniels,
Auditors.

LEGISLATIVE REPORT

To the Members of Toronto Society of D. S. & H. E.

As chairman of the Legislative Committee of the above society for 1916, I beg to submit the following report:

While things have not been very brisk during this year regarding legislative matters, I am pleased to give you a synopsis of the following matters, to which considerable time and thought have been given:

Regarding the Workmen's Compensation Act, application has been made by the labor and medical interest to have first-aid provided for adoption by the Provincial Board of Health, and all plumbing installations to comply with all rules and regulations regarding standard appliances.

The raise of our local license fee in conjunction with the Board of Examiners for plumbers.

All necessary changes in the present plumbing ordinances, also in the methods in vogue in the plumbing department.

Steps also are being taken to amend the Medical Health Act, whereby it will be necessary for the sanitary engineers to be on every local health board.

Also progress is being made on the Steam Boilers Act and an amended Act, which is to be adopted.

Thanking you for the pleasure of being chairman of the Legislative Committee for 1916, and hoping to be of much help to my successor, I beg to remain,

Yours truly,
(Signed) Robt. J. Shannon.

EDUCATIONAL COMMITTEE

To the Members of the Toronto Society of D. S. & H. E.

Gentlemen,—As chairman of the Educational Committee of your society for the past year, I wish to make a report of the work accomplished during my term of office. At the commencement it was my ambition to help create a suitable reference library for the benefit of our members who visit the business room frequently, and also for those who wish to acquaint themselves of any new method which was brought to their attention, or came up when doing work. As a finished product, our library is far from being complete, and perhaps it is not just what it really should be, as we had to consider carefully any matter involving finance, owing to the uncertainty of the conditions.

The Standard Sanitary Manufacturing Company very kindly donated a set of books, written by Mr. Cosgrave, relating to the craft, which has been very much appreciated by the members, and I may say have been in use continually. Mr. Lock, chief librarian of the Toronto Reference Library, corner College and St. George Streets, has offered to provide a department for books relating to our subject, and if they will just ask for him, he will do all in his power to furnish them with the information desired. This is certainly a very kind offer, and should be much appreciated by the members, and taken advantage of by them without hesitation. A great majority of our members subscribe to trade papers concerning our welfare, but how many read them over, or even take a fair glance over the pages before they are discarded? I venture to say very few. These papers should be read very carefully, as they contain very valuable information at times which it is necessary to know. They will expand as we expand. Consequently, they should be supported. They often contain valuable data, and are posted on different methods used for the advancement of our craft here and elsewhere. The plumber and his ways of olden times are gone, we hope, forever. We refer to ourselves now as the domestic, sanitary and heating engineers. This title, like others you know, is not a gift, but must be acquired by successfully passing examination set by a board of examiners, consisting of one journeyman, one member of the medical health staff, and our own Mr. Le Grow. This advancement will promote our craft and also insure the citizens of good workmanship, as they are now becoming so educated that they feel they must employ licensed sanitary engineers if they want suitable repairs made or any new work installed.

During the past year a great deal of attention has been devoted to our apprentices. After serving three years, he must be examined and pass an examination, conducted by a board of four journeymen and three of our own members, viz., Mr. John Wright, Mr. Thomas Maxwell, Mr. Harry Waterman, and our worthy secretary, before he is considered capable of handling tools. At the end of four and a half or five years he must pass another examination before he is qualified as a journeyman. This method will insure our members of better mechanics in the future, better men in the trade, and a better standing for the society.

The course at the Central Technical High School will also be a great help to the society in the future. If any of you have a spare evening I can assure you it will be time well spent if you will call around when the trade classes are in operation. The class in our line is taught by our worthy friend, Mr. John Fullerton, a very capable teacher.

Here the practical side of our craft, as well as the theoretical, both in plumbing and heating, is taught.

During the past few months members of our society located in the north-end section of the city have been banded to-

gether for the express purpose of benefiting one another. Some of the ways they have arrived at are a standardizing of the prices of material and labor, better systems of bookkeeping have been established, and also banding together for the purpose of buying material in quantities in order to secure reduced prices and at better terms. The above I consider to be a very good idea, as it will bring the domestic and sanitary engineers closer together than they have ever been before, and in helping one another will help all concerned, and considerably strengthen the society.

Now, gentlemen, in closing, I consider the year 1916 has been a successful one for this society, and that great results may be looked for in the early future. One suggestion I would like to make is that the society try to arrange lectures, if one for a short period of each regular meeting. We have good business men who could give the younger member excellent advice as to how best to run his business successfully, and I feel they would be only too willing to do so. Firms would be pleased to send a representative to give a short talk on what they represent.

Fred A. Wiles, Chairman.

REPORT OF THE ENTERTAINMENT COMMITTEE

To the Toronto Society of D. S. & H. Engineers

Gentlemen,—As chairman of the Entertainment Committee, I wish to report that the year 1916 has been a very successful one. You all know of the splendid time given us by our Buffalo friends, and also of the huge success which attended our annual picnic. I cannot say the baseball team was as successful as we wished, but most of our Ty. Cobbs were so busy, and that coupled with scarcity of men, made it hard for them to attend. Our committee at the beginning of the year received $25 for expenses, but take note that we returned $54.75, so that from a financial point of view we have no regrets.

We expect during the year 1917 to have another joint outing with our Buffalo craftsmen at a point near Niagara-on-the-Lake, and I would impress upon the members that with the same support and co-operation that we received in 1916 we will again have "some" time.

I also wish to draw your attention to the Canadian Convention at Montreal in June. This big boat should be a most enjoyable trip, and I would like to see a party made up of Toronto members.

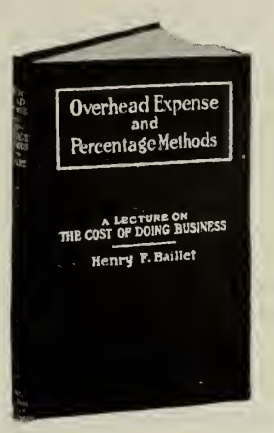
In closing, I wish to thank Secretary Frankland for the great help and co-operation he at all times is so ready to give. I also thank the officers and members for the hearty support and enthusiasm they have displayed throughout the past year, and assure them that with the same support and enthusiasm in 1917 our society should become a prominent feature in Toronto.

Yours very respectfully,
H. A. Farthing, Chairman.

New Sanitary and Heating Goods

NEW BOOK ON OVERHEAD EXPENSES

One of the most interesting little books ever published upon the above subject is now being issued to the trade at a very reasonable price. It is a book of about 130 pages, cloth bound, 4½ x 7 inches and contains a large number of useful tables. The author has collected his data from actual business experiences, and shows how and how not to figure, full particulars and prices may be procured from the Technical Book Dept., MacLean Publishing Co., 143-151 University Ave., Toronto.



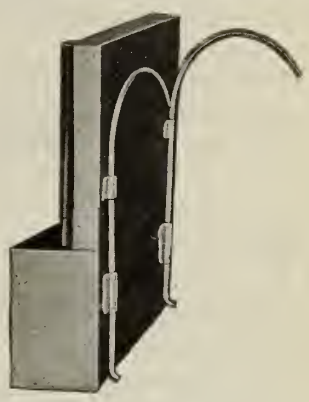
New book on overhead expenditure.

NEW GOODS

Another new line which appears to claim some attention from sanitary engineers is that of the Eureka Humidifier. It comprises a strongly made receptacle of metal, a frame and a vapor stone, the surface of which is made of ground stone and charcoal and forms an evaporating surface for the moisture held in the pan. The water that is held in the pan is gradually passed off as needed into the room. However, the de-humidifying properties of this surface are just as great, and if there is too much moisture in the room, the stone absorbs it.



Showing Vapor Stone and Filler.



Showing Back of Eureka Humidifier.

There is a filling funnel in the centre so arranged that the pan can be easily filled without the necessity of removing it from the radiator. No doubt anything that will moisten the air in our buildings is to be commended. Further particulars may be procured from the manufacturers, the Eureka Blotter Bath Co., Chicago, Ill.

NEW PRICE LISTS

One of the latest price lists to come to our notice is that of a 12-page pocket size boiler and radiator price booklet, now being issued by the Pease Foundry Co., King street east, Toronto. Plain figures are the outstanding feature, with net and re-sale amount shown.

To those who wish to be in a position to quote "off the bat," such little books will prove a benefit, and we understand that new lists will be furnished promptly to those on the mailing list.

Expansion and Construction Defined

Teacher—What are the properties of heat, Johnny?

Johnny—Properties of heat is that it expands bodies while cold contracts them.

Teacher—Very good. Can you give me an example?

Johnny—Yes'm. In summer, when it is hot, the days are long; in winter, when it is cold the days get shorter.

THE SANITARY ENGINEER

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VOL. XI. FEBRUARY 1, 1917 No. 3

HAVE YOU TAKEN STOCK YET?

THIS is stock-taking time for many. What are we doing? Are we taking stock of either ourselves or our worldly goods? We should, if we are to know how we stand.

Simply because business is slack should be no excuse for not taking an inventory, and like removing from one house to another, we will no doubt find scores of little accumulations about which we knew little.

The writer once cleaned up a stock in a large manufacturing concern, and found goods on hand that had almost been forgotten, and the value had increased by quite a lot. The owner stated, "well, we have made 25 per cent. on those by 'losing track of them'," but he happened to be one of those fellows who did not trouble to take stock very often, did not reckon his overhead, and the fact was that the business, while paying presumably a nice profit, was losing nearly 10%. But "he owned the property," had his son and daughter working in the office. Of course they didn't count. Those lost goods had really been a cost to the business. So we would urge upon every reader of THE SANITARY ENGINEER to "take stock." Make an inventory of one's stock in trade, or one's abilities and capabilities, either personal or otherwise. The inventory will always show how we stand and in just such a way prove that stock-taking is very essential to every person under the sun.

TORONTO SOCIETY REPORTS

AT THIS season of the year, there appears to be a feeling among men that they should look back and see "What I have done," "What I have left undone," and "What I intend to do in the new year." A real mental stock-taking. It is a good sign when men meet early in the year to discuss business matters and make plans for a greater time to come.

It is a good sign to be able to say to oneself, "Well, I see my mistake now." Such an acknowledgment is proof that one has gained wisdom by one's mistakes.

The various reports submitted by the different chairmen of the executive committees are very encouraging. The spirit of progress permeates the whole. Three outstanding features in these reports are worthy of comment. First the sentiments embodied in the president's report, viz.:—Better business relationship between the trade as a whole and their source of supply, an appeal to adopt better business methods and conduct cleaner businesses, to encourage prompt payments, and to have specified days for settlement.

Whatever stand be taken these things must come to pass, more attention must be paid to credits and collections on both sides.

The next point referred to is the work being done in the interest of apprentices. This is splendid work. It is the heralding in of the time when the present members of the craft will be able to look back with pride and see the obstacles now prevalent have been overcome; when members of the craft will be looked upon with respect instead of being victims of ignorant sneers and jibes.

Lastly the report deals with the work being accomplished by the sanitary and heating committees.

Materials are being tested, manufacturers are furnishing samples freely, thus enabling those engaged in the work to prosecute it in as intelligent a manner as possible. This committee can be called upon to investigate conditions that may and do arise from time to time, and such investigations are bound to result in great benefits to the whole trade, both the craft and the manufacturers.

The heating committee's report is somewhat outspoken and certainly breathes a sincere hope that members of the craft will become more and still more competent, by studying the best and most reliable methods of installation. Manufacturers do not really wish to furnish plans and specifications, at least so we are informed. But as the chairman reports, many members of the trade call upon the manufacturers for assistance, which only proves that the heating engineer himself is not what he professes to be. However, we come back to the apprenticeship question, and must hope and trust that the boys now in training will be masters of the situation in the days to come.

EDITORIAL BRIEFS

IF WE live to learn, we shall learn to live, better, therefore let's all live and learn, particularly the apprentice.

* * *

WE LEARN by our mistakes, and the man who says he never made a mistake only thinks so. He himself must be a conglomeration of mistakes.

* * *

THE Late Elbert Hubbard once said:

> "The man who never made a mistake, never made anything else worth a d—n."

And that's true.

New Canadian Patents

No. 171,732.

Anthony Joseph Lewkowicz, New York City, U.S.A., 5th September, 1916; 6 years. Filed 12th July, 1915. Receipt No. 253,863.

Claim.—1. A water heater comprising two oppositely inclined tubes connected together at their converging ends, surrounding jackets for said tubes forming a water space therewith, an inlet header at the outer end of one of the said jacketed tubes and an outlet header at the outer end of the other of the said jacketed tubes in circulation with the water space, a burner opposed to the outer end of the jacketed tube having the outlet header, whereby the heated gas passes through said tubes in the opposite direction to the movement of the water through the water space so that the hottest gas will be in the vicinity of the water outlet where the temperature of the water is the highest,

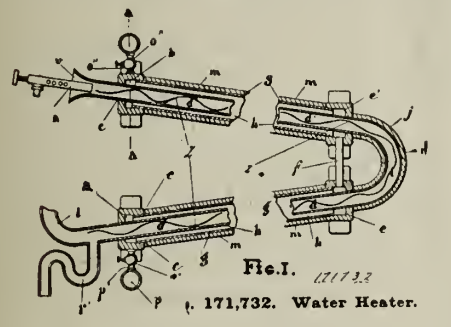


Fig. I.

No. 171,732. Water Heater.

and the coolest gas will be in the vicinity of the water inlet where the temperature of the water is the lowest, thus gradually and continuously accelerating the rapidity of the circulation of the water through the heater and decreasing the speed of the flow of the gas through the tubes.

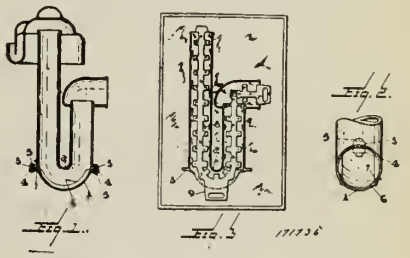
2. A water heater comprising two oppositely inclined tubes connected together at their converging ends, surrounding jackets for said tubes forming a water space therewith, an inlet header at the outer end of one of the said jacketed tubes, and an outlet header at the outer end of the other of the said jacketed tubes in circulation with the water space, a burner opposed to the outer end of the jacketed tube having the outlet header, whereby the heated gas passes through said tubes in the opposite direction to the movement of the water through the water space so that the hottest gas will be in the vicinity of the water outlet where the temperature of the water is the highest, and the coolest gas will be in the vicinity of the water inlet where the temperature of the water is the lowest, thus gradually and continuously accelerating the rapidity of the circulation of the water through the heater and decreasing the speed of the flow of the gas through the tubes, and a trap inserted at the outer end of the lowermost tube.

3. A water heater comprising two oppositely inclined tubes connected together at their converging ends, surrounding jackets for said tubes forming a water space therewith, an inlet header at the outer end of one of the said jacketed tubes and an outlet header at the outer end of the other of the said jacketed tubes in circulation with the water space, a burner opposed to the outer end of the jacketed tube having the outlet header, whereby the heated gas passes through said tubes in the opposite direction to the movement of the water through the water space so that the hottest gas will be in the vicinity of the water outlet where the temperature of the water is the highest and the coolest gas will be in the vicinity of the water inlet where the temperature of the water is the lowest, thus gradually and continuously accelerating the rapidity of the circulation of the water through the heater and decreasing the speed of the flow of the gas through the tubes, and a helical baffle within the tube to retard the circulation of the gas.

4. A water heater comprising two oppositely inclined tubes connected together at their converging ends, surrounding jackets for said tubes forming a water space therewith, an inlet header at the outer end of one of the said jacketed tubes, and an outlet header at the outer end of the other of the said jacketed tubes in circulation with the water space, a burner opposed to the outer end of the jacketed tube having the outlet header, whereby the heated gas passes through said tubes in the opposite direction to the movement of the water through the water space so that the hottest gas will be in the vicinity of the water outlet where the temperature of water is the highest, and the coolest gas will be in the vicinity of the water inlet where the temperature of the water is the lowest, thus gradually and continuously accelerating the rapidity of the circulation of the water through the heater and decreasing the speed of the flow of the gas through the tubes, a trap inserted at the outer end of the lowermost tube, and a helical baffle within the tube to retard the circulation of the gas.

Robert MacGilchrist, Toronto, Ontario Canada, 5th September, 1916; 6 years. Filed 7th July, 1916. Receipt No. 267,482.

Claim.—1. A syphon formed with a U-bend of substantially circular section having two parallel cylindrical legs and having the bottom part of the U formed of a separate piece fitted to the syphon with a tongue and groove joint, said bottom at its ends extending up each leg of the syphon substantially to the level of the inner bend of the U, its sides being substantially concentric with the curve of the U and its cross section somewhat less than a semi-circle, and a pair of lugs at each end of the bottom, one cast on the legs of the syphon and the other on the bottom, whereby the bottom may be secured in place.



No. 171,736. Syphon for Septic Tanks.

2. A syphon formed with a U-bend of substantially circular section having two parallel cylindrical legs and having the bottom part of the U formed of a separate piece fitted to the syphon with a tongue and groove joint, and a pair of lugs at each end of the bottom, one cast on the leg and the syphon and the other on the bottom, whereby the bottom may be secured in place.

NEW CATALOGUE AND PRICE LIST

The Port Hope Sanitary Manufacturing Co., Ltd., Port Hope, whose head offices are Royal Bank Building, have issued a new loose leaf catalogue and price list to the sanitary engineering trade. It contains a vast amount of useful information and should be in the possession of every sanitary engineer in Canada. We understand that these books can be procured upon writing the above company.

GEO. E. B. GRINYER, PRESIDENT HERBERT E. BATES, VICE-PRESIDENT A. R. CALCOTT, HEATING ENGINEER

The Geo. E. B. Grinyer Co., Limited

CONTRACTORS

DOMESTIC SANITARY, HEATING AND ELECTRICAL ENGINEERS

26 WEST MARKET SQUARE

Guelph, Ont., January 18th, 1917

Editor The Sanitary Engineer,
Toronto, Ont.

I have been unable to take the time to give you an article such as you asked for on your last visit to Guelph, but I can assure you that words cannot express what I personally owe to the Sanitary Engineer for the real good information I have derived from your paper from time to time, which has been a source of great help and inspiration in the building up of our business.

I not only read your paper--("and say, it is a fact these things are true") but I believe in putting the real thing into action. The article on the cost of doing business is well worthy of comment. It has been a pleasure to read these facts that are laid before us, and I trust more of the readers will get their eyes open. In our own business we keep before us our actual overhead expense or cost of operation account, and I realize that the only way to figure cost is on your selling price.

If each person in the Plumbing and Heating business would sit down and figure out just what expense is incurred in the following items, it would possibly be the finest thing that ever happened to the trade at large: Owner's Salary, Office Salaries, Rent, Postage, Stationery, Insurance, Interest on Preferred Stock, Taxes (local and business), Telephone Tolls, Telephone Rental, Advertising, Printing, Workmen's Compensation Tax, Coal, Gas and Electric Light, Cartage, Carfare, Depreciation on Stock and Tools, Legal Expenses, Bad Debt Account, Losses by Theft, Donations, Interest and Discount, Auto and Wheel Account, Patriotic Donations, Trade Periodicals, Stock-keeper's Salary, Lost Shop Time, Lost Labor replacing defective material, and Sundry Expenses.

I also enclose you table showing the percentage of cost which must be added to effect a given percentage on sale. The percentage of profit should always be figured on the selling price, and not on the cost.

5%	added	to	cost	is	4 3/4	profit	on selling price
7 1/2%	added	"	"	is	7%	"	" " "
10%	added	"	"	is	9%	"	" " "
12 1/2%	added	"	"	is	11 1/8%	"	" " "
15%	added	"	"	is	13%	"	" " "
16 2/3	added	"	"	is	14 1/4%	"	" " "
17 1/2%	added	"	"	is	15%	"	" " "
20%	added	"	"	is	16 2/3%	"	" " "
25%	added	"	"	is	20%	"	" " "
30%	added	"	"	is	23%	"	" " "
33 1/3%	added	"	"	is	25%	"	" " "
35%	added	"	"	is	26	"	" " "
37 1/2%	added	"	"	is	27 1/4%	"	" " "
40%	added	"	"	is	28 1/2%	"	" " "
45%	added	"	"	is	31%	"	" " "
50%	added	"	"	is	33 1/3%	"	" " "
55"	added	"	"	is	35 1/2%	"	" " "
60%	added	"	"	is	37 1/2%	"	" " "
65%	added	"	"	is	39 1/2%	"	" " "
66 2/3%	added	"	"	is	40%	"	" " "
70%	added	"	"	is	41%	"	" " "
75%	added	"	"	is	42 3/4%	"	" " "
80%	added	"	"	is	44 1/2%	"	" " "
85%	added	"	"	is	46%	"	" " "
90%	added	"	"	is	47 1/2	"	" " "
100%	added	"	"	is	50	"	" " "

In the course of the last few weeks I have been more than surprised to find how few of the business men of our city have got the right idea of figuring cost--there is great need yet of more publicity in this matter.

We who are in the Plumbing and Heating line have yet hardly appreciated the real good work that you are doing along this line. Possibly at a later date I shall be able to give you some very interesting facts that shall be of interest to the trade as a whole.

Your paper which I received to-day has some real good things which I have enjoyed very much indeed.

Wishing you the Compliments of the Season, and prosperity for the coming year, I remain

GEBG/MC.

Yours very sincerely,

GEO. E. B. GRINYER.

The above is only one of the many letters of appreciation sent in to the Sanitary Engineer. We certainly feel that our efforts are being appreciated by our readers, and hope they will co-operate with us in making the Sanitary Engineer of still greater value to them by letting us know how we can still further improve this their exclusive paper.—Editor.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Boiler tubes have advanced approximately 15 per cent., with the demand reported increasing on the approach of spring. Galvanized and black sheets held steady in a firm market. Best American oakum has advanced ¼c per pound, but plumbers' spun oakum has held steady in price. Solders have advanced in price since last issue, owing to the higher price commanded by tin. Asbestos sheeting is firm and advancing. Sinks, bathtubs and range boilers held steady at recent quotations. Soil pipe and wrought pipe have also been unchanged. Valves of various kinds remained unchanged. Business in the plumbing trade has been somewhat quiet. Demand for steam valves has continued good, however. Reports from country districts are quite encouraging to the supply houses and manufacturers, as indications there seem to point to a fairly good spring building trade in dwellings.

TORONTO, Jan. 31.—There have been some price changes in the time intervening since last issue, all of which are in an upward direction. Chief among these are the higher prices for solder, one grade of oakum, boiler tubes and corrugated sheets. There have been a number of advances in the price of old materials. Demand for wrought pipe remains unchanged, and a fair demand is reported for this commodity. Generally speaking, the plumbing trade is still quiet. From the manufacturers of valves the report is made that trade in this line is reasonably good.

Boiler Tubes Have Advanced 15 Per Cent.

BOILER TUBES.—An advance of approximately 15 per cent. has been recorded in the price of boiler tubes, for both the cold drawn and the lapweld. Demand for this commodity is increasing with the approach of spring, and dealers are anticipating a good trade during the coming months. Following are the net prices per 100 feet:

	Per 100 Feet	
	Cold Drawn	Lapweld
1-inch	$21.00	.....
1¼-inch	24.00	.....
1½-inch	27.00	$25.00
1¾-inch	27.00	21.00
2-inch	31.00	21.00
2¼-inch	31.00	.....
2½-inch	36.00	27.50
3-inch	47.00	32.00
3¼-inch	.....	37.00
3½-inch	51.00	40.00
4-inch	58.00	50.00

Solder and Solder Wire Higher in Price

LEAD AND ZINC PRODUCTS.—There has been an advance of 1c to 1¾c per pound in the price of solder since last issue. Solder wire has also registered an advance of 2c per pound, the lowest quotations being moved up. Zinc sheets have held steady in price during the week. The advance in solder products is stated to be due to the firm market for tin. Following are the quotations:

Lead pipe, lb.	$0.13	.....
Lead waste pipe, lb.	0.14	.....
Lead traps and bends	Net list	
Lead wool, lb.	0.12	.....
Lead sheets, 3 lbs. sq. ft.	0.12¼	.....
Lead sheets, 3½ lbs. sq. ft.	0.12¼	.....
Lead sheets, 4 to 6 lbs. sq. ft.	0.12	.....
Cut sheets, ¾c lb. extra and cut sheets to size 1c lb. extra.		
Solder, guaranteed, lb.	0.29¾	.....
Solder, strictly, lb.	0.27¼	$0.28¾
Solder, commercial, lb.	0.26¼	.....
Solder, wiping, lb.	0.24¾	0.26¼
Solder, wire, lb.	0.29	0.35
Zinc sheets, per lb.	0.25	.....

Asbestos Building Paper Advance in Some Quarters

BUILDING PAPER.—Asbestos building paper has advanced in certain instances during the week, and is being quoted up 2c per pound. Some of the concerns who have been quoting at 8c per pound have raised their price to 10c per pound. There is a continued scarcity in this commodity, as the manufacture has been discontinued in this country. Dealers have been inquiring among dealers in the United States as to the possibility of securing supplies there, and it is stated that goods brought in from that source would have to be sold in the neighborhood of 15c per pound when duty and freight is considered.

Charcoal in City Routes Up 2c Per Bag

CHARCOAL.—Local dealers in charcoal have advanced the price of charcoal on their city routes from 8c per bag to 10c per bag, making an upward movement to the extent of 2c. The question of whether it will be advanced to country points had not yet been decided upon at the time of writing, but it is expected this point will be decided upon before the present week is over. This new price in city stores necessitates that the retailer sell at 13c per bag, or two for 25c. In some instances the retailer is charging 12c with an extra 1c added for war tax, while in other cases in the city it is selling at a straight 15c per bag. There is strong probability that the price will be raised to country points also.

Some Grades of Oakum Have Advanced in Price

OAKUM.—An advance of ¼c per pound has gone into effect on the price of best American oakum, which now makes the selling price $20.75 for the lowest quotations on this commodity. There is a scarcity of this commodity reported. Higher prices are anticipated for this product at the opening of navigation, when larger quantities of it are used. Prices of other oakums have held steady. Plumbers' spun oakum is quoted from $8 to $8.50 per hundred.

	Per Lb.	
Plumbers' spun	$ 0.08	$ 0.08½
Best American	20.75	21.00
U.S. Navy (American)	20.00	20.35
Clipper U.S.	28.00	.....
U.S. Navy (English)	16.50	.....

Old Metals Record Advances During Week

OLD METALS.—There has been a number of changes in the price of old metals during the week, most of which are in the upward direction. Tea lead is quoted ¼c up, heavy lead pipe ¼c up, red brass ½c up, light brass ½c up, heavy zinc 1c up, heavy copper 1c up. Old rubbers are easier in price, and are being quoted ¼c down. While thet embargo on scrap iron and steel is still in force, licenses are being issued for the exportation of steel boring and turnings up to the end of the month, and the question of further extension is under

consideration. Much satisfaction is felt in the trade over the installation of electric furnaces at the Ashbridge's Bay industrial district, Toronto, as it is understood that large quantities of steel scrap, particularly turnings and borings, will be utilized. Prices being paid locally are as follows:

	Per lb.	
Tea lead	$ 0.05¾	....
Heavy lead pipe	0.07¾	....
Yellow brass	0.15½	....
Red brass	0.19	....
Light brass	0.10	....
Heavy zinc	0.07½	....
Old cast iron, per ton	15.50	$16.00
Stove plate, per ton	11.50	....
Old rubbers, boots and shoes	0.08¾	....
Overshoes, lumbermen's rubber boots	0.06½	....
Auto tires	0.05½	....
Bicycle tires	0.02½	....

Demand for Steam Valves Continues Good

VALVES.—The demand for steam valves has continued good, according to reports from manufacturers. In other valve lines the demand has been seasonable. Prices have held steady during the week. Manufacturers are still experiencing a difficulty with the labor problem, a shortage of the right kind of help being reported. Following are the quotations:

	Per Cent.
Ground work	45-47
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2,	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	20
Globe, angle and check valves, standard	25
High grade	20
Radiator valves, standard	30
High grade	30
Patent quick opening valves	60
Basin Cocks—	
No. 0 & 1, Fuller pattern	53
No. 0 & 1, compression	49
Midget	51
Steam cocks, square nut	50
Steam cocks, iron body	45
Globe, angle and check valves, medium pressure	40
Radiator valves, standard	60
Radiator valves, Jenkins disc	60
Radiator valves, quick opening	60

Conductor Pipe and Eavetrough Held Steady

CONDUCTOR PIPE, EAVETROUGH. —Prices have held steady during recent weeks; plain conductor pipe, O. G. eavetrough and eavetrough conductor elbows are still being sold at 35 per cent. discount off list prices. Following are the list prices:

PLAIN CONDUCTOR PIPE.

2 in., in 10-foot lengths	$ 8.00
3 inch	9.70
4 inch	12.80
5 inch	17.50
6 inch	21.30

O. G. EAVETROUGH.

8 inch	$ 6.90
10 inch	7.70
12 inch	9.10
15 inch	12.50

EAVETROUGH CONDUCTOR ELBOWS.

2 inch	$ 1.90
3 inch	2.20
4 inch	3.60
5 inch	9.00
6 inch	10.50

Above lists subject to 35 per cent. discount.

Range Boilers and Enamelware Unchanged

ENAMELWARE, BOILERS. — The market so far as price changes go has been an uneventful one. Demand for these commodities is not heavy under present conditions. Plumbers' supply houses do not anticipate much activity until people more generally get in the building mood again. This is not likely to take place until peace prevails. Quotations remain the same as in last issue

30-gallon range boilers, standard	$10.00
30-gallon range boilers, extra heavy	12.50
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	23.70
Bathtubs, 5½ ft.	27.30
Sinks, roll top, 18 x 30 in., staple	12.15

Robertson same. Canada Metal same.

Soil Pipe Prices Held in Steady Market

SOIL PIPE.—Prices have held steady during recent weeks. The demand for soil pipe is somewhat limited at present owing to the absence of any extensive building operations. Following are the discounts from lists quoted at Toronto on this commodity:

	Discount
Medium and extra heavy soil pipe, 6-inch and under	55%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	60%

Fair Demand for Wrought Iron Pipe

WROUGHT PIPE. — Demand for wrought steel pipe is reported fair by the manufacturers. There have been no price changes during the time since last issue, but the market might be characterized as one of firmness. Manufacturers are not anticipating any declines in the face of the conditions. They look for continued strength, and in this condition would not be surprised if it developed into an upward movement.

	Per 100 ft. Blk.	Glvd.
Buttweld		
⅛ in.	$ 4.25	$ 5.75
¼ in.	3.54	5.67
⅜ in.	3.54	5.67
½ in.	4.59	6.16
¾ in.	5.64	7.76
1 in.	8.33	11.48
1¼ in.	11.27	15.53
1½ in.	13.48	18.56
2 in.	18.13	24.98
2½ in.	28.67	39.49
3 in.	37.49	51.64
3½ in.	46.92	63.94
4 in.	55.59	75.76
Lapweld—		
2 in.	21.09	27.57
2½ in.	31.59	41.83
3 in.	41.31	54.70
3½ in.	51.52	68.54
4 in.	61.04	81.21
4½ in.	71.12	94.62
5 in.	82.88	110.30
6 in.	107.50	143.00
7 in.	142.80	186.80
8 in. L.	150.00	196.30
8 in.	172.80	226.10
9 in.	207.00	270.80
10 in. L.	192.00	251.20
10 in.	247.20	323.40

Metal Markets Are Very Firm

COPPER.—The market locally remains firm, with a price quoted of 35½c lb.

TIN.—Tin is firmer and has registered an advance in some quarters. Ruling prices are from 47c to 48c lb.

SPELTER.—There is really no market for spelter at present. Supplies are very scarce, and a wide range of prices is being quoted from 13c to 15c lb.

LEAD.—Lead is firmer this week, and advances in price have been registered. The tendency of the market is upwards. Locally the price ranges from 9¾c to 10c lb.

ANTIMONY.—The market is strong due to the reduced supply of antimony, but quotations are unchanged and nominal at 18c per pound.

ALUMINUM.—The market is easier on poor demand, but quotations are unchanged at 68c per pound.

NEW TYPE OF GATE VALVE

The Penberthy Injector Company, Limited, of Windsor, Ont., have just added to their line a new type of high grade gate valve.

This gate valve is designed along the same lines that characterize their other line of valves and embodies the same feature, viz., the external thread construction on the bonnet to the body of the valve. This type of construction is preferred by many leading engineers. The valve is always accessible and can be taken apart at any time without the liability of straining it. This feature also prevents the enlargement of the bonnet end of the valve causing loose-fitting threads and permits of a very compact valve body. The disc employed is of the solid wedge type, which eliminates the trouble found in many of the split disc design. All Penberthy Gate Valves are equipped with a non-rising spindle and are manufactured of the best steam metal and are registered and approved by all provinces.

The above company will be pleased to mail on request literature covering the full line and we feel sure same will be found of decided interest to all users of steam goods.



NEW PLUMBING ESTABLISHMENT FOR JARVIS, ONTARIO

W. Wright and H. Berry, both of Stratford, Ont., who up till lately were in the employ of C. J. Werner, plumber and tinsmith, left for Jarvis, Ontario, where they intend starting up in that line of business.

CHANGE OF NAMES

Longard Brothers, Halfax, N.S., date their business establishment back to 1806. The business will in future be known as Longards, Limited, incorporation having been secured. The officers of the new company are named as follows:

President—C. C. Longard.

Vice-President—A. H. Longard.

General Manager—John J. Hines.

Secretary Treasurer—W. H. Wilson.

With these gentlemen will be associated F. J. Lordly, accountant. The company will succeed Longard Brothers, taking over and continuing the extensive business of that firm in heating, plumbing and mechanical engineering in general. Longard Brothers have had an extensive patronage in the past and are well and favorably known in all parts of the country. The new company solicit a continuance of the same, and are introducing improvements in every department to enable them to give even better service than hitherto. THE SANITARY ENGINEER extends to Longard's Limited, best wishes for continued success and prosperity

NOTICE.

BOILER INSPECTION.

The Steam Boiler Act, Chapter 252, R.S.O. 1914, With Amendments Chapter 58—6, George V.

Steam Boilers.

All steam boilers constructed for use in Ontario must be built from designs which have been approved and allotted a registration number by the Steam Boiler Branch.

Used boilers, boilers sold or exchanged, and unregistered boilers brought into the Province must be inspected prior to being put into operation.

Notice of repairs to steam boilers, stating the nature and extent of same, must be sent to the Steam Boiler Branch, and should such repairs be considered extensive by the Chief Boiler Inspector, the boilers will be required to be inspected.

In each and every case the inspections must be made by Inspectors authorized to inspect boilers under the Steam Boilers Act, who are employed only by the Steam Boiler Branch of the Department of Public Works. Official certificates with the maximum working pressure stated thereon are issued to the owners of the boilers so inspected.

Steam Piping

Drawings and Specifications of all high pressure steam piping must be approved and registered by the Steam Boiler Branch before any work of installation is commenced. The drawings submitted should show clearly the dimensions and layout of the main steam lines. Full particulars should be given as to the material used in the construction of the piping, and all valves and other fittings used in connection therewith must be of approved make.

Any deviation from the above requirements shall be deemed a violation of the Steam Boilers Act.

All communications in this respect should be addressed to the Steam Boiler Branch Department of Public Works, Parliament Buildings, Toronto.

HON. F. G. MACDIARMID,
Minister of Public Works and Highways.

W. A. RIDDELL, M.A., Ph.D.,
Supt. Trades and Labor Branch.

D. M. MEDCALF,
Chief Inspector of Steam Boilers.

MONTREAL MASTER PLUMBERS

Election of Office-Bearers for the Year 1917.

Meeting early in the year The Master Plumbers' Association of Montreal and Vicinity elected their officers for the current year as follows:

Past President and Representative to the Builders' Exchange, L. J. Conroy.

President, Walter Ryan.

First vice-president, James Griffin.

Second vice-president, Joseph Laurier.

Honorary secretary, W. R. J. Hughes.

Chairman of sanitary committee, P. C. Ogilvie.

Chairman of Arbitration committee, James Ballantyne.

Chairman of Legislation committee, Thos. O'Connell.

Chairman of Apprentice committee, J. R. Meadowcroft.

Chairman of price list committee, John Watson.

Audit Committee

Mesrs. J. E. Walsh (Convener), R. J. McAuley and James Saunderson, Trustees, John A. Gordon, A. Cherette, and J. McIntyre.

Secretary, David K. Trotter.

No business of extraordinary importance has up to the immediate present come up before the Association since the election of officers for the New Year, but a number of matters of minor importance have been discussed and dealt with.

JOHNS-MANVILLE SALESMEN MEET

The salesmen and heads of departments of the H. W. Johns-Manville Company, together with the general managers of the various departments of the company met in Toronto at the King Edward Hotel during the week from January 15 to January 20. There were present some thirty-eight salesmen from all parts of Canada and discussion on the various topics was led by some of the managers from the New York office of the company. Those who presided over the various topical discussions were L. R. Hoff, general sales manager; H. R. Wardell, general manager of the roofing department; B. C. McClure, general manager of the insulation department, and J. Berdan, general manger of construction. W. M. Hiller, general manager for Canada, presided over the deliberations of the convention. This was the first convention of the Canadian branch. The idea of the convention was to thoroughly familiarize the salesmen with the difficulties attending the manufacture of products in the way of high costs of raw material, shortage of labor and generally to put them in touch with the situation in order that they may be better able to press for trade in the face of the necessity for higher prices for commodities. The banquet was dispensed with this year, the company feeling that the money could be put to better use for patriotic purposes. Reports on prospects for future business were very encouraging.

MAY SEAL UP THOSE SMELLS

"The Toronto Board of Control recently adopted Controller Foster's motion, that the Commissioner of Works consider sealing manholes of sewers in districts of the city from which complaints of offensive odors

mounting from the sewers are being received and substituting adequate ventilating shafts.''

With reference to this decision by the Board of Control, it might not be out of place to explain a few of the conditions which are involved in Toronto. First of all, the main house trap and breather is demanded on all plumbing. Tile pipe is allowed under the buildings. The main sewers are not ventilated, and sewer air is being emitted from every manhole cover, winter and summer. In winter it can be observed because of the difference in temperature, but the same conditions exist all the year round.

It does not appear to be realized that the very fact that this gas is discharging up from the sewers through these manhole covers against an atmospheric pressure of nearly 15 lbs. per square inch, proves that the sewers are not ventilated.

To ventilate, means to overcome atmospheric pressure by some means either by fans or suction of some kind or other, and, therefore, it will be necessary to erect shafts or some means to offset the pressure at the manholes.

Now, what does this mean? Does it mean that the city fathers are going to follow the most impractical line and erect shafts on purpose to ventilate the sewers, or what? The above quoted newspaper paragraph would lead the public to believe so. It would appear that practical men have not been consulted in the matter because of the fact that all that is required is to eliminate the main house trap and breather, thus providing a clear opening from the main or trunk line sewers to the top of our buildings, through the now existing soil and vent pipes used in connection with the plumbing installations. Every one of these outlets, or what is termed ''roof terminals,'' would act as a ventilating shaft, and would be the most natural and ideal way of ventilating our sewers.

The City of Ottawa does not demand the main house trap and breather. The City of Montreal does not, to our knowledge, and if they do, we are sure the practical men do not endorse the practice, just as is the case in Toronto. The City of Bristol, England, and hundreds of other large towns and cities, do not allow the main house trap and breather. Further, no one in Toronto has ever put up a good enough line of practical arguments in favor of the use of these contraptions.

It seems too bad that a city like Toronto, the queen city of this fair Dominion, should be so far behind in such a matter when, apart from that and the use of clay tile pipe for house branches, we believe the present plumbing ordinance to be equal to any other in the world.

The choked drains, the vile odors, the cut-up lawns, the polluted ground, and the non-ventilated sewers, are all the direct results of sticking to tile pipe and main house traps.

In the long run the citizens of Toronto are paying heavily for all these things.

TORONTO VISITOR FROM WINNIPEG

Yes, I believe things are improving a little out West, was the reply to a question asked of L. A. Willson, manager of the Anthes Foundry, Ltd., Winnipeg, during his sojourn in Toronto, recently. ''There seems to have been a real toning down of the unnatural business tendencies which were prevalent a few years ago.'' In those days business men appear to us to have taken too many chances, and between the slump and the war combined, a lesson no doubt has been learned.

In the sanitary and heating trade, Mr. Willson expressed his opinion that there is a change for the better. Improved fittings are being used and better methods of construction seem to be receiving more attention. The new SAMO soil pipe fittings are being manufactured by his company. These were described about two years ago in SANITARY ENGINEER. Mr. Willson's family spent a few weeks' holiday in their former home town, Kitchener, and have now returned with him to the White West.

THE RESULTS OF CO-OPERATION

In the series of articles now appearing in the SANITARY ENGINEER, reference is made to the co-operative plan in operation by the Crane Co., Chicago. The bonus for 1915 is given as 10 per cent. of the salary earned, this 10 per cent. amounted to $750,000, which was distributed among the employees of the company at Christmas, 1915.

1916 Bonus

We have just received the information that last Christmas, 1916, the sum of $900,000 in gold was distributed, each employee of the company receiving 10 per cent. of his annual earnings.

For the seventeen years that this plan has been in operation, approximately $7,000,000 has been presented to the employees of the Crane Company in this way. This year, or rather the last Christmas gift was participated in by about 12,000 persons, embracing all the employees in the general offices and shops, and all the branches of the company throughout the United States and Canada.

As usual the payment was accompanied by a neat Xmas card, on the reverse side of which was printed:

''For age and want save while you may,
No morning sun lasts a whole day.''

Such recognition of service can never be erased. Such co-operation cuts out ''cost of doing business.'' There is no cost. It is all credit. Credit to the concern, to the goods, and to the worker. Cost is a liability, while true co-operation is an unreliable asset, which creates compound profit. Let us all co-operate for the common good in our ''busyness.''

LET ''SECONDS'' BE BANISHED

Some months ago, says the Valve World, the Enameled Sanitary Ware Manufacturers' Association decided to discontinue the sale and shipment of ''seconds.'' It is significant that this action was taken on requests coming from various trade organizations throughout the country. According to the announcement of the association twenty-one well-known makers of enameled sanitary ware now allow nothing but first-class products to leave their factories and warehouses.

This action is sound in the highest degree. It is almost an axiom in business that the sale or use of defective goods not only lowers the character of the whole line in which they are used but actually has an inimical effect on the sale of high grade products. ''Seconds'' act as a leaven for the whole lump, and the leavening is in the direction of lowering rather than of raising the standard.

Cheap goods invariably mean cheap workmanship, for no workman is going to put the care on installing cheap and inferior or defective goods that he would on goods of guaranteed high quality. In such an important matter as sanitation nothing but the best possible ought to be recognized. All ''seconds'' should be banished. The best the manufacturer can turn out installed in the best way known to the business of sanitary engineering is a combination none too good for homes and other buildings where human beings live and work.

With the leading manufacturers firmly against the marketing of ''seconds,'' we have a solid foundation upon which to build a body of opinion so strongly against the sale and use of defective sanitary goods that they will be driven eventually entirely out of the market.

BUILDING NEW FACTORY

Beatty Bros., of Fergus, will establish a foundry at Chelsea Green, along the London & Port Stanley Railway tracks. The building to be erected will cost $28,000 or $30,000. The company will manufacture iron pumps, barrel churns, grain grinders and hand and power washing machines. Beatty Bros. have hitherto bought their castings.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

Proper Place for Pump Cylinder

Editor The SANITARY ENGINEER:

Kindly let me know through the pages of the Question Box of the SANITARY ENGINEER where I should place the cylinder on a well pump, to be pumped by hand, when the well is 54 feet deep from the surface to the bottom and the water is 2 feet deep. Also can you tell me if a foot valve is necessary or not?—C. J. H. W., Ontario.

It is assumed that the pump is to be installed right on top of the well. If such is the case the cylinder can be installed in two ways, either submerged in the water or say up to 8 or 10 feet out of the water, and in any case a good foot valve should be put on the end of the pump or pipe.

There should also be some provision made to strain the water before it enters the pump.—Editor.

Trouble With Hot Water Job

Editor THE SANITARY ENGINEER:

I have installed a plumbing job in the country. The people have also had a pressure system installed. They have a warm air furnace and insisted upon having the range boiler put in the basement, and connected to the furnace. There is also soft and hard water pressure tank near the furnace which made it necessary for me to put the boiler behind the furnace.

I wrote to the furnace people about a coil and they said, "put a piece of ¾-in. pipe up through the top of the furnace and connect it to side of boiler. I know the connection is wrong, but my customer appears to know better. They have some friends in the city who also appear to know all about such work. They are getting no hot water, though they don't blame me in any way, but I am not satisfied, neither are they at not getting hot water.

Will you please let me know how this job should be installed that hot water can be procured?—G. M. B., Ontario.

In the first place, it will be noted that the boiler is within a few inches from the floor; second, that from the floor to the ceiling appears to be 7 feet. This may however be without allowing for the joist, but even so, there should be at least 6 ft. 2 inches of room.

Such being the case, the boiler could be placed 8 inches from the floor, allowing 6 inches at top of boiler for connecting up. In any case the boiler must be as high as possible, even if the joists have to be trimmed to get the pipes in. Fig. 1 shows the sketch submitted by G. M. B., which, it goes without saying, could not work. Fig. 2 shows how it can be made to work, by cutting through the side of the furnace radiator, and using the same pipe as is at present fitted through the top.

Fig. 3 shows a regular heater made for the purpose of installing in the dome of a warm air furnace. It is a circular ring with a one-inch tapping in centre as well as side. In connecting such a heater up it is good practice to have it up above the fire door, use one-inch pipe to the outside of the furnace and reduce by using a one-inch by ¾-in. elbow at A and B, Fig. 3.

However, if the sketch, Fig. 1 is out of proportion, and for some reason or other the range boiler has to be left on the floor, then it will be absolutely necessary to instal a regular heater in the way shown in Fig. 3 or Fig. 4. A 12-inch one will do, and can be procured from the Robert Bigley Co., Macdonald avenue, Toronto.

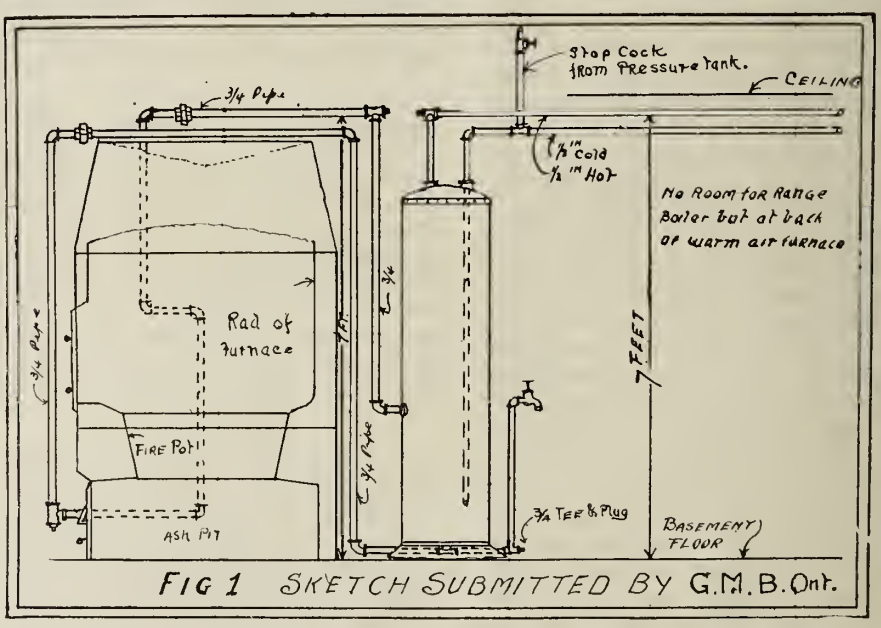


FIG 1 SKETCH SUBMITTED BY G.M.B. Ont.

It might not be out of place to state here that when the boiler is placed practically on the floor, as shown in Fig. 1, a larger amount of heating surface will be needed than would be required if the boiler is higher up, as shown in Figs. 2 and 3; at the same time the coil or heater should be nearer the fire.

It is bad practice to put a heater too close to the live coal fire, or even to run a pipe through the fire pot, as is very

(Continued on page 30.)

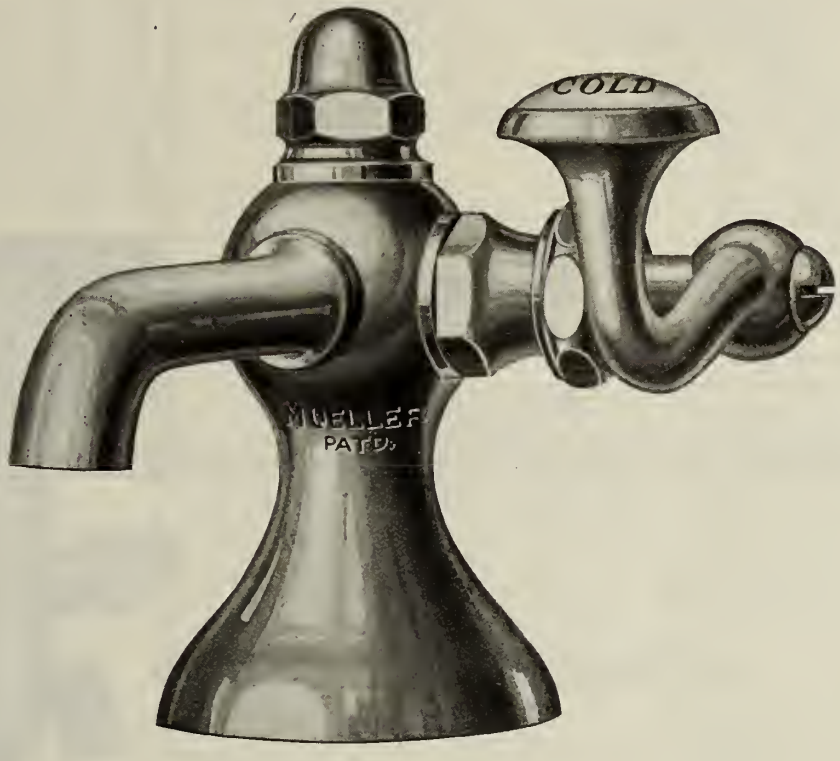
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Self-Closing Basin Cock

SIDE LEVER INDEX HANDLE

Patent No. 159487

December 15, 1914



D.—11950

A REAL ARISTOCRAT

of symmetrical design and proportion.

Opens with the most natural action.

Made regularly with flat spout 3½ inches from centre of cock body to centre of spout opening; furnished 2¾ inches centre to centre to specification only.

MANUFACTURED ONLY BY

H. Mueller Mfg. Company, Limited

SARNIA, ONTARIO

Makers of Fully Warranted Water, Plumbing and Gas Brass Goods.

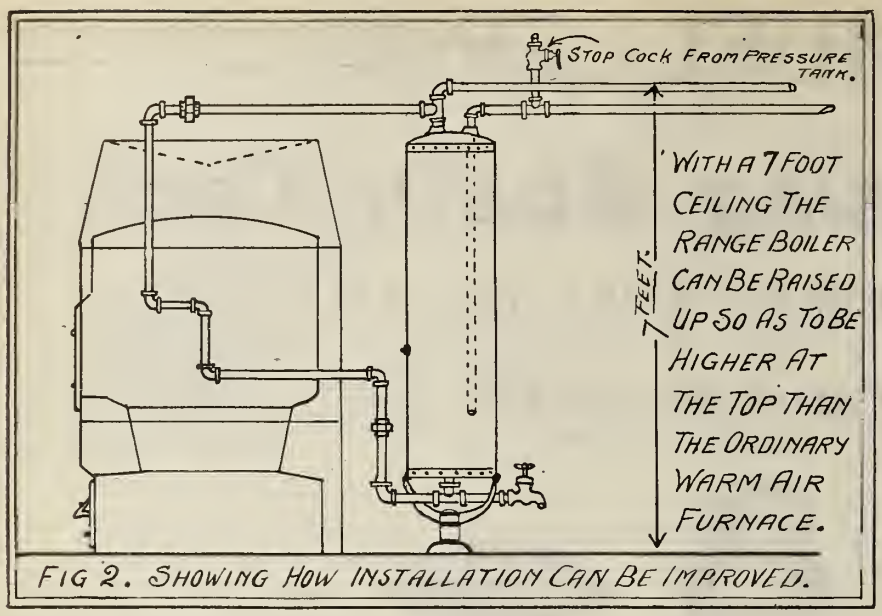


FIG 2. SHOWING HOW INSTALLATION CAN BE IMPROVED.

THE QUESTION BOX

(Continued from page 28.)

often done. There is one particular furnace concern well known to the writer that actually bored the firepot and ran a piece of 1¼-inch pipe through the portion which will be filled with live red coal when the furnace is used. Needless to say, this is not only bad, but very dangerous. Referring again to Fig 1, it might be said that no job can work that is trapped in this way. All hot water systems must be installed in a circular manner. Fig. 6 shows the principle involved in all. No matter what condition or location, there must be one pipe running in a continuous direction, not doubling back on itself and therefore causing a trap, or portion of pipe that would not drain, were it opened at a lower point. It will be seen that even if the plug at the bottom of pipe where the bibb is in Fig. 1, were to be opened, there would still be water in that portion of the pipe which is run through the bottom of the furnace. Note the difference in all the other illustrations.

Fig. 5 is a form of heater made by the Pease Foundry Co., Toronto. It also is fitted through the side and top of warm air furnaces.—Editor.

Of Course It Did

Sandy, the plumber, was working on a town job with an apprentice. In the course of the forenoon the boss visited the job, and, failing to find Sandy anywhere about the premises, decided to await his return.

"Where have you been?" demanded the boss, when Sandy put in an appearance.

"Gettin' ma hair cut," answered Sandy, quite coolly.

"And how dare you get your hair cut in my time?"

"Well, dinna it grow in your time?"

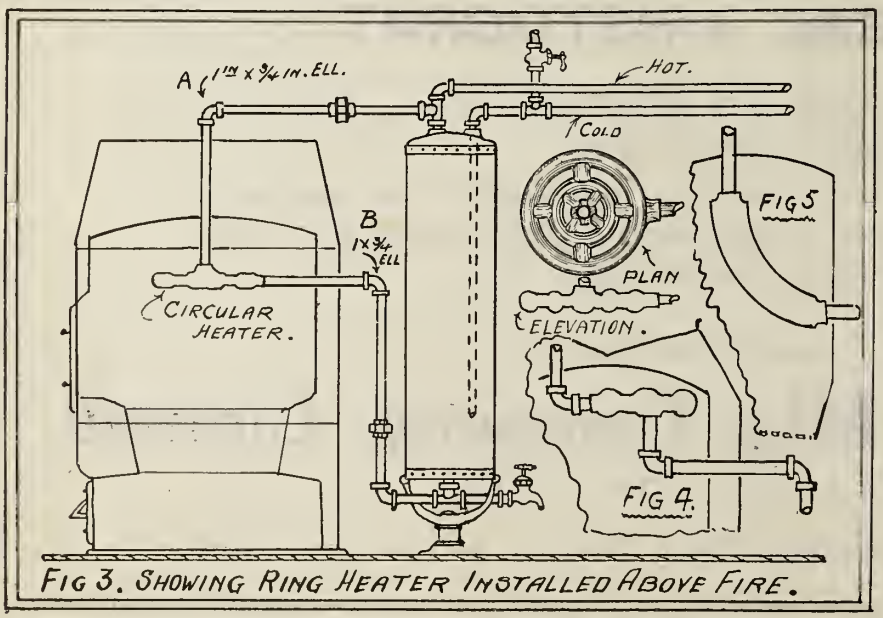


FIG 3. SHOWING RING HEATER INSTALLED ABOVE FIRE.

PURO
SANITARY
Drinking Fountains
WILL PROVE A PROFITABLE LINE TO HANDLE

BECAUSE

The "Safety First" movement, which is becoming more popular every day, is particularly forcible where the conservation of the Public Health through pure drinking water is concerned. The old-fashioned, disease-laden public drinking cup will soon be but a memory in thousands of plants, offices, shops, public parks, schools, etc.

Herein lies the opportunity of the live Sanitary Engineer to materially add to his business by getting after those institutions and supplying them with the "Puro," the most economical and sanitary drinking fountain on the market.

The Puro Sanitary Drinking Fountain will recommend itself because of its simplicity of attachment, and its automatic control.

Write to-day and let us show you how to make a handsome profit, not only on the sale, but also on the installation of the "Puro."



Puro Sanitary Drinking Fountain Company
147 University Ave., Toronto, Canada

Kindly mention this paper when writing advertiser

SITUATION VACANT

WANTED — CAPABLE BOILER AND Radiator Salesman, permanent situation with excellent opportunity for advancement. Apply by letter, stating experience and salary earned in last position. The Gurney Foundry Co., Ltd., Toronto.

J.M.T.

You can put a stop to faulty hot water systems by installing

The Knickerbocker Generator

It is a positive remedy that is easily applied to the open or closed systems of hot water heating. Entirely automatic.

Connects with one-inch nipple to outlet of expansion tank.

Makes a hot water system equivalent to a low pressure steam plant.

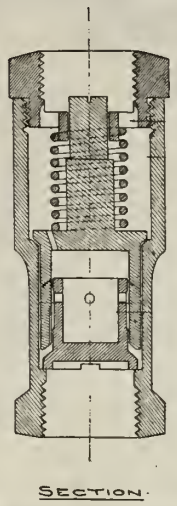
Increases radiation from 25 to 30% with same firing.

Reduces the size of pipes and fittings.

Temperature of water can be varied up to 250 degrees.

A top-notch profit producer.

Particulars on request.



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THE JAMES MORRISON BRASS MFG. CO., LIMITED

93-97 Adelaide St. West, Toronto

J.M.T. J.M.T. J.M.T.

Our Mixed Metal Sales Amount to Over $5,000,000 Annually

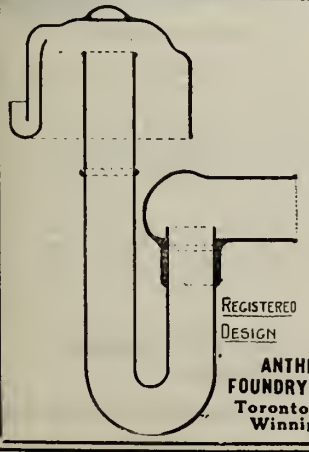


HOYT'S WIPING SOLDER is as perfect as experience and first class ingredients can make it. As only one perfect Wiping Solder can be made we manufacture only one grade, which must necessarily be Hoyt's high standard of quality.

Special attention is called to our Bar Solders, Wire Solders, Lead Pipe, Waste, Traps and Bends. Your orders will have prompt and careful attention, not sometimes—but all the time.

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y.; London, Eng.; St. Louis, Mo.



IF IT'S SYPHONS, ASK US

And look at this one. Note the long caulking length.

Ask us about our inside vented syphon. It's a dandy. Saves making many joints.

We unconditionally guarantee every syphon to operate automatically. And it has no moving parts.

Ask your jobber for "Anthes" Syphons and accept no other.

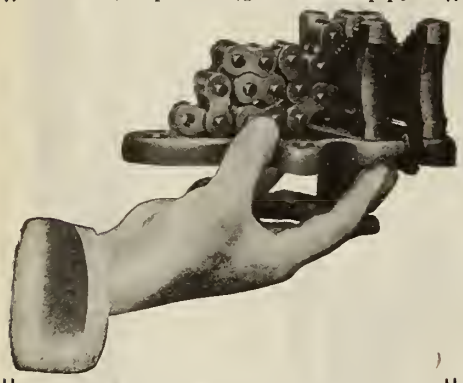
ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

SINCE IT'S ONLY A HANDFUL

WHY LEAVE IT BEHIND?

3 Sizes Capacities ⅛ to 8 inch pipe



WILLIAMS "VULCAN" CHAIN PIPE VISE

Before you return you may need to turn a thread, make a bend, cut off an end or perform any of the other ordinary operations for which a steamfitter is usually summoned.

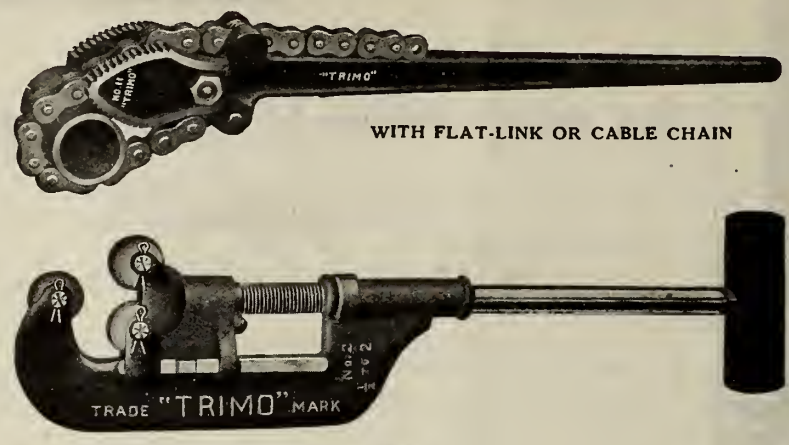
Better go prepared and clinch a life-long customer on your first visit.

They won the "Grand Prize" of the P.P.I.E.

J. H. WILLIAMS & CO.
77 Richards Street BROOKLYN, N.Y. CITY
The Wrench People

World-Famed Specimens of the Age of Steel

TRIMO



TOOLS

WITH FLAT-LINK OR CABLE CHAIN

Send for Catalog No. 91

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TRIMONT MFG. CO., 55 Amory Street, Roxbury, Mass., U.S.A.

R. O. Wynne-Roberts, Consulting Sanitary Engineer

310 Temple Building, Bay Street, Toronto

Water Supply, Sewerage, Sewage Disposal of Cities, Villages and Institutions.

There's Money in Selling Modern Gas Appliances

Those whose business it is to plan and erect modern homes are realizing more and more that one of the greatest recommendations for a modern house is that it should be equipped for the ready installation of gas appliances. Gas ranges, gas fires, gas water heaters and other gas equipment, are in such growing demand nowadays that they should be borne in mind at the outset of building operations.

Sanitary Engineers, everywhere, can reap a good profit by handling up-to-date gas goods. In the city of Toronto the Consumers' Gas Company is creating the demand—and it is just here where the sanitary engineer can reap a benebenefit. We are ready to co-operate with any dealer who is ready to stand back of any modern gas equipment for the home, and who will advocate its adoption.

Every Sanitary Engineer should be an Enthusiast for Gas and Gas Appliances

The Consumers' Gas Co'y.

12-14 Adelaide Street West, - TORONTO

Phone Adelaide 2180



— *soon pays for itself*

The Hall No. 2 Rapid Upright Roller Pipe Cutter

MADE IN CANADA

Regular capacity ½ in. to 2 in., with extra cage will take ⅛ to ⅜ in. pipes. Cuts from 400 to 500 pieces of 1 in. pipe per hour.

IN A MEDIUM-SIZED SHOP IT WILL SAVE ENOUGH TIME AND PIPE TO EASILY PAY FOR ITSELF IN LESS THAN TWO YEARS, AND AFTER IT IS PAID FOR THE SAVINGS GO TO MAKE LARGER PROFIT.

WEIGHT, 700 LBS.

INVESTIGATE THOROUGHLY—send for catalog and prices on all sizes, and let us put you in touch with users so that you will know how Hall m.. pleasing others.

Delivery from stock. No delay.

JOHN H. HALL & SONS, Limited

BRANTFORD, CANADA

"THE KING"
OF THEM ALL

Note the thin waterways and wide heatways. Just look at the deep fire-pot. Every pound of coal is given a chance to transmit heat to the radiators.

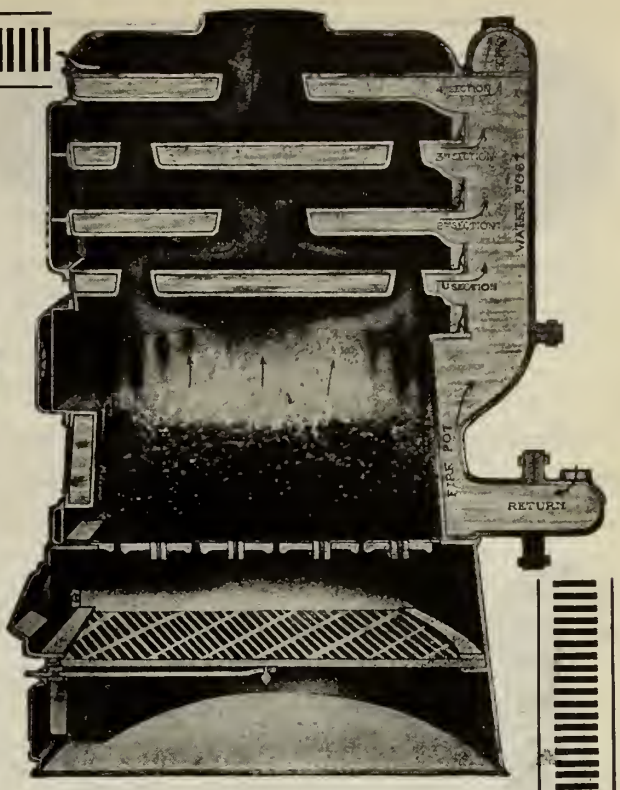
These are the outstanding features which make King Boilers the most effective heating appliance on the market.

STEEL and RADIATION, Limited

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304 University Street, MONTREAL **101 St. John Street, QUEBEC**

AGENCIES IN ALL LEADING CITIES



Sectional View "King" Boiler, High Base

LOOK AT THE WATERWAYS

ALPHABETICAL LIST OF ADVERTISERS

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GENUINE BELL WASHERS


FULLER

The only washer made that will stand hot and cold water. Look for the name on every washer. None genuine without it.

Sold By All Canadian Jobbers.

Manufactured only by

Estate of Andrew Bell

2-4-6 Commercial St. Newark, N.J.



The CRANDON

Clock Thermostat

is a very neat design; in fact, it is an ornament to any room; it is positive in its operation, simple in construction, and guaranteed for a lifetime.

Install a Crandon Heat Regulator with every job. Low list, long discounts.

Write for booklet today.

DARLING BROTHERS, LTD.

MONTREAL, CANADA

Branches: Toronto and Winnipeg

Agents: Halifax, St. John, Calgary, Vancouver



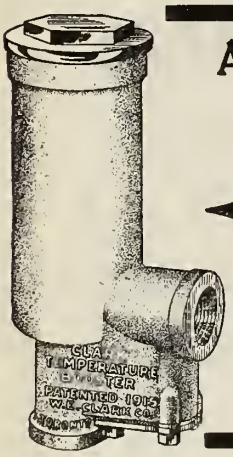
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BY USING THE QUATURN SILENT BALL COCKS IN YOUR Closet Combinations

A Post Card Will Bring Prices and Full Construction Details.

WALLACEBURG BRASS & IRON MFG. CO LTD.

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A REAL BOOSTER AND A CANADIAN

Boosts Temperature. Boosts profits, and will build up a reputation for every one installing the Clark Temperature Booster.

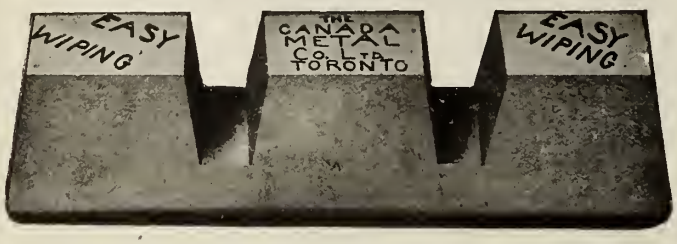
W. E. CLARK, LIMITED

719 KING ST. W. TORONTO

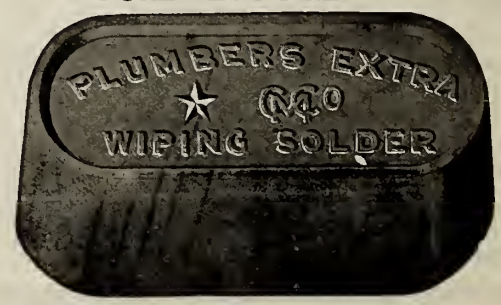


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EASY WIPING SOLDER



PURE BLOCK LEAD



The Canada Metal Co., Limited, Toronto

Hamilton Montreal Winnipeg Vancouver

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Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Air Valves.
Empire Mfg. Co., Ltd., London, Ont.
Canadian Wolverine Co., Ltd., Chatham.
Beaton & Cadwell Mfg. Co., New Britain, Conn., U.S.A.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Out.
Steel & Radiation, Ltd., Toronto.
Beaton & Corbin Mfg. Co., Southington, Conn.

Asbestos Goods.
James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Empire Mfg. Co., Ltd., London, Ont.
Canadian Wolverine Co., Ltd., Chatham.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Limited, Galt.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Brass Pipe and Tube.
B. O. T. Manufacturing Co., Toronto.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Empire Mfg. Co., Ltd., London, Ont.
Canada Metal Co., Ltd., Toronto.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Drainers.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Closets.
Empire Mfg. Co., Ltd., Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.

Country Residence Equipments.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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W. E. Clark Co., Ltd., Toronto.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Ejectors, Steam.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

Ejectors for Sewage.
Darling Bros., Ltd., Montreal.
National Equipment Co., Ltd., Toronto.

Enamelware.
Amherst Foundry Co., Ltd., Amherst, N.S.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

Electric Pumping Machinery.
Empire Mfg. Co., Ltd., London, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

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Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Floor and Ceiling Plates.
Beaton & Cadwell Mfg. Co., New Britain, Conn., U.S.A.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.
Beaton & Corbin Mfg. Co., Southington, Conn.

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National Equipment Co., Ltd., Toronto
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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Galt Brass Co., Ltd., Galt.
Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Generators.
W. E. Clark & Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Heaters.
Darling Bros., Ltd., Montreal.
Lord & Burnham Co., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Mixing Valves.
Canada Metal Co., Ltd., Toronto
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope
Speakman Supply & Pipe Co., Wilmington, Del.

Monkey Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Oil Storage Systems.
National Equipment Co., Ltd., Toronto.

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Canadian Wolverine Co., Ltd., Chatham.

Packless Radiator Valves.
W. E. Clark & Co., Toronto.
Kerr Engine Works, Walkerville.

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Beaton & Cadwell Mfg. Co., New Britain, Conn., U.S.A.
Beaton & Corbin Mfg. Co., Southington, Conn.

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Canadian Tube & Iron Co., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

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Trimont Mfg. Co., Roxbury, Mass.

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Canadian Wolverine Co., Ltd., Chatham.
James Morrison Brass Mfg. Co., Ltd., Toronto.

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Galt Brass Co., Ltd., Galt.
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James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Radiator Foot Rests.
Beaton & Cadwell Mfg. Co., New Britain, Conn., U.S.A.

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Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

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C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Canada Metal Co., Ltd., Toronto.
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Darling Bros., Ltd., Montreal.
Dart Union Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville, Ont.

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C. A. Dunham Co., Ltd., Toronto.

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James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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C. A. Dunham Co., Ltd., Toronto.
W. E. Clark & Co., Ltd., Toronto.

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Cluff Mfg. Co., Toronto.

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W. E. Clark & Co., Ltd., Toronto.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Water Supply Systems.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.

WROUGHT PIPE

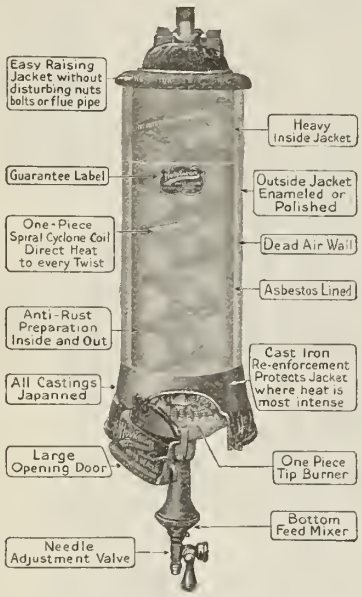
BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES Black and Galvanized All Sizes

Ask your jobber for Ⓒ Brand

CANADIAN TUBE & IRON CO., LIMITED
Montreal Works: Lachine, Can.

Quality Survives



Service—Speed—Economy

If your jobber can't supply you—write direct

HE HOTSTREAM HEATER CO.
CLEVELAND, OHIO

W. H. Cunningham, 99 Kingswood Rd., Toronto, Canadian Representative.

Isn't it a fact that YOU can buy "Water Heaters" at any old price? But did you ever stop to realize that your CUSTOMER buys the SERVICES of the heater—not the heater itself? Even if he THINKS he wants the cheapest heater made, he EXPECTS GOOD SERVICE, and if he doesn't get it he BLAMES YOU. He FORGETS his only saving is in first cost, yet DEMANDS that it meet with HIS idea of a Water Heater in SERVICE, SPEED and ECONOMY.

Hotstream Heaters are built to meet YOUR CUSTOMER'S VIEWPOINT—he is the man to be ultimately satisfied!

Remember — you can't buy Creamery Butter for the price of Oleo.

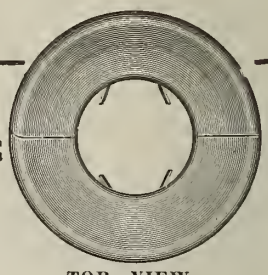
Yet the price of a Hotstream is small compared to what its EXCELLENT SERVICES justify.

You owe it to your business to investigate and compare Hotstream Heaters with those you are using.



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

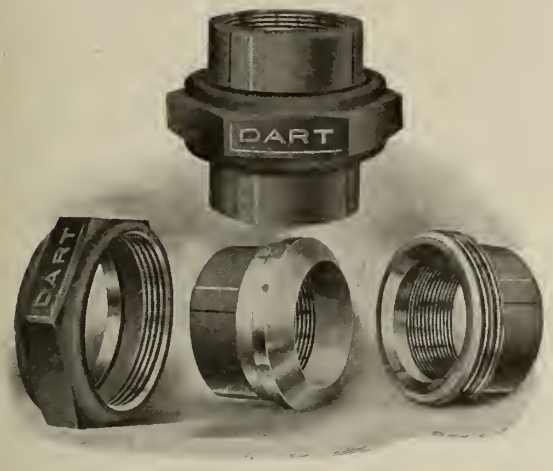
The BEATON & CADWELL MANUFACTURING Co.
New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

TWO CENTS PER WORD

You can talk across the continent for two cents per word with a WANT AD. in this paper.

Good Work Brings More Jobs



Manufactured by
DART UNION CO., Limited
Toronto, Canada

You can make sure that your pipe couplings will stay tight by using

DART UNIONS

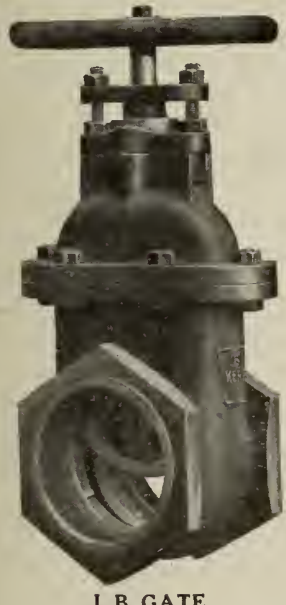
THEY NEVER LOOSEN UP AND LEAK, because both faces of the joint are of bronze (a non-deteriorating metal), and the heavy iron parts cannot stretch or pull apart.

The faces of the joint being ball-shaped, **connection is easily and quickly made,** whether pipes are in or out of alignment.

Backed by twenty years of successful record.

Your jobber sells them.

KERR GATE VALVES



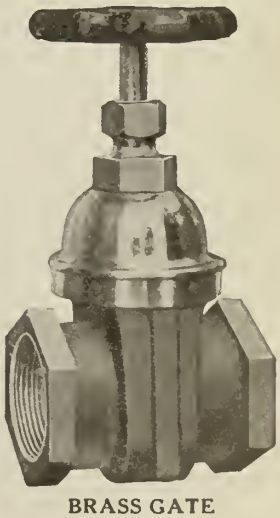
I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.

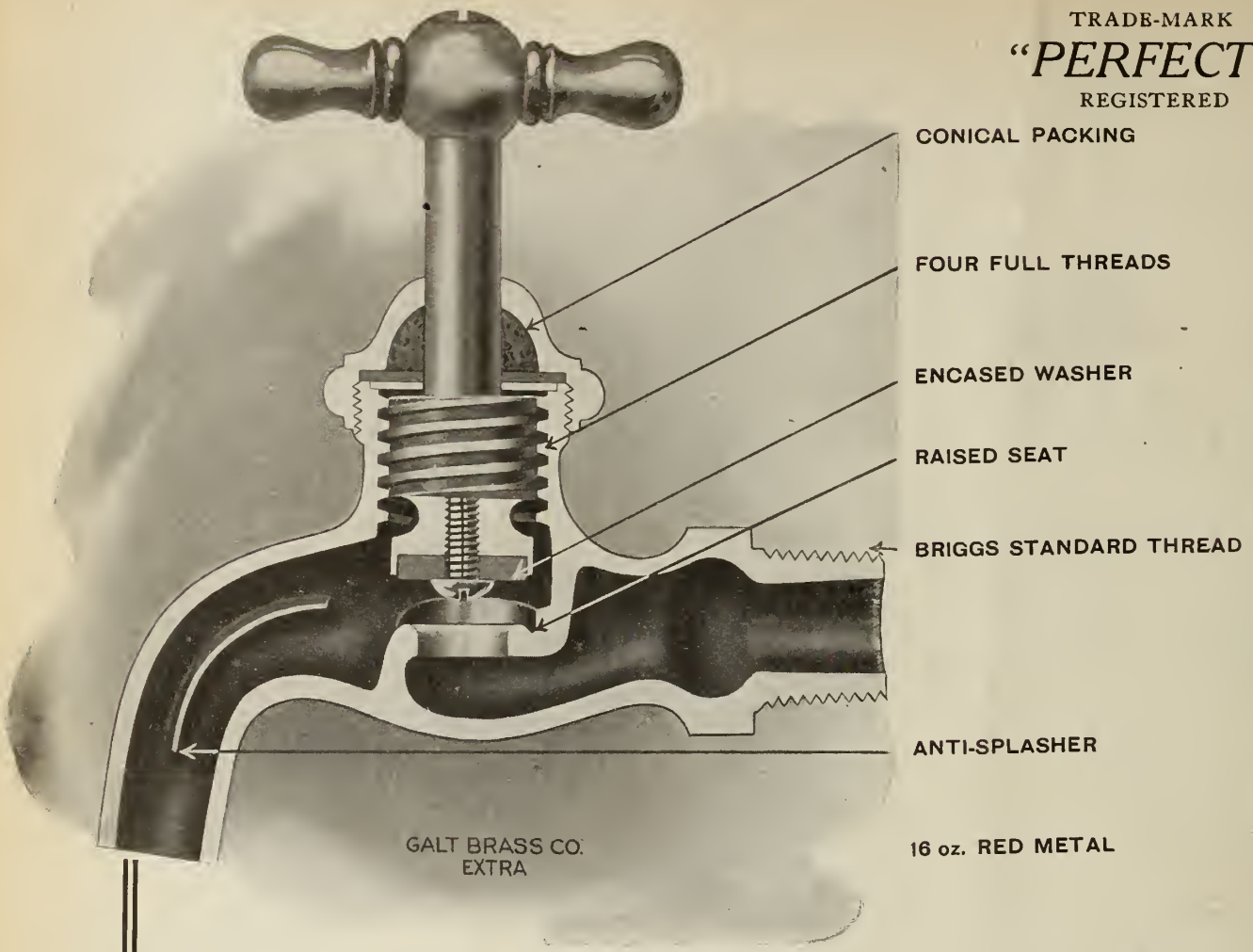


BRASS GATE

THE KERR ENGINE COMPANY, LIMITED

WALKERVILLE, ONTARIO

TRADE-MARK
"PERFECTO"
REGISTERED



The above illustration shows, in actual size, the exact construction of all our Bibbs.

They are all Quickopening, having Double Thread on stem.

The same features are also embodied in all our Bath, Basin and Sink Cocks.

GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

The Galt Brass Company, Limited

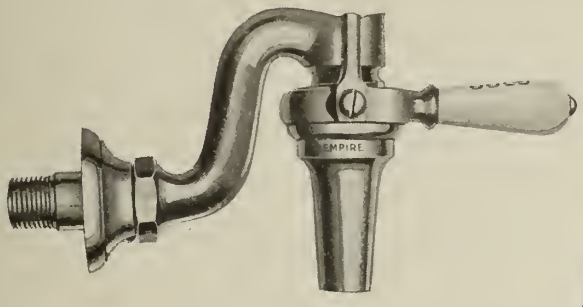
Galt, Canada

THE SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

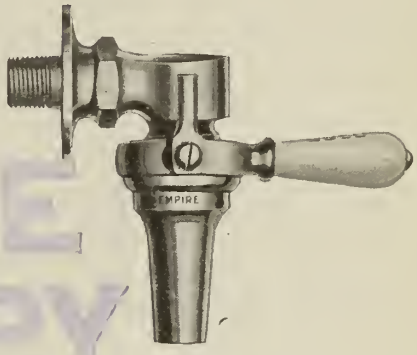
THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, FEBRUARY 15, 1917 | No. 4

EMPIRE HIGH-GRADE BIBBS



A 237
"KITCHENER" PACKLESS QUICK-OPENING BIBB, SWAN NECK, CHINA HANDLE



A 238
"KITCHENER" PACKLESS QUICK-OPENING BIBB, STRAIGHT NECK, CHINA HANDLE

"Kitchener" Packless, Quick-Opening Faucets have been designed specially for kitchen, slop sink and laundry trays where quick and easy operation, durability and absence of splashing are specially desirable.

A half-turn of the lever turns on full stream. The long nozzle delivers the water in a large, smooth, solid stream, with the least possible splashing, and avoiding entirely the spreading and spattering frequently noticed with other styles of bibbs. They are made of a high-grade red metal and require no packing.

Send us a trial order, the others will follow.

Empire Manufacturing Co., Limited

LONDON **TORONTO**

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

ONTARIO:
Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

For more than half a century we have been manufacturing rubber goods of every description. We have learned to know "what's what" in rubber goods for the Plumbing and Engineering trades, and can satisfy every demand, from whatever source it may come.

No matter what the rubber need may be, you are guaranteed reliable quality when it bears the mark or brand of the Dominion Rubber System.

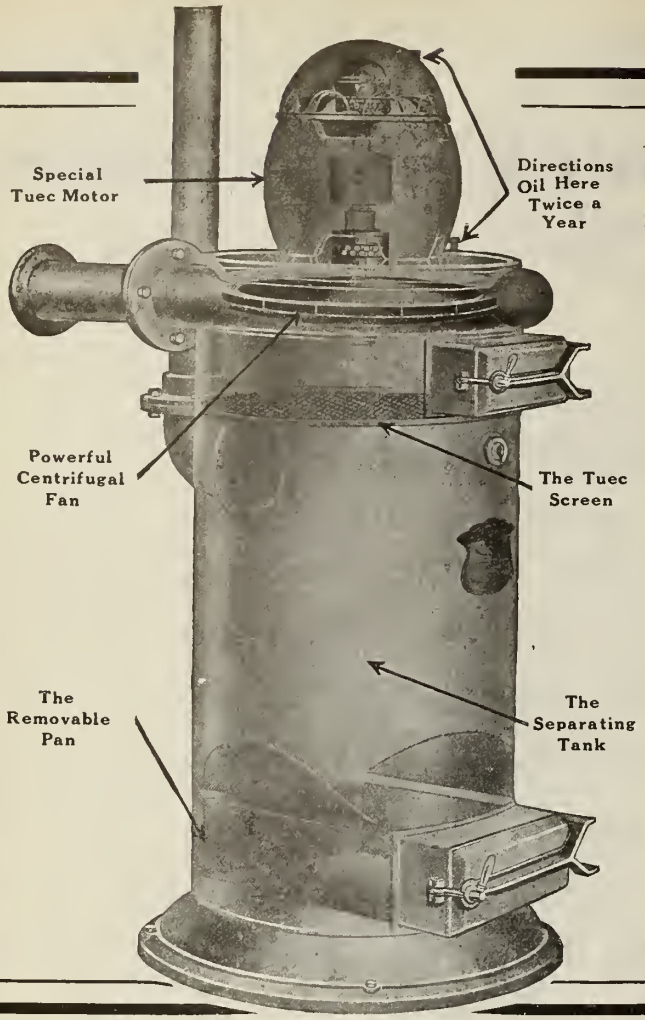
Back of all is the attention we give to prompt and satisfactory deliveries. In that respect you have a service that is not equalled within your reach.

Put us to the test. Write our nearest branch and see how we aim to please and serve the trade.

Canadian Consolidated Rubber Co. Limited

Head Office - - - Montreal

Service Branches at **Halifax, St. John, Moncton, Quebec, Ottawa, Toronto, Hamilton, Brantford, London, Kitchener, North Bay, Fort William, Winnipeg, Brandon, Regina, Saskatoon, Calgary, Edmonton, Vancouver, Victoria.**



HEALTH AND WEALTH ASSURED

THAT all dusty homes and buildings are insanitary, goes without saying. Every particle of dust can be removed from every corner of the room by using a TUEC.

UNTIL every Sanitary Engineer fully realizes that dust means death to the inhaler of dust, they cannot rightly claim the title "Sanitary Engineers."

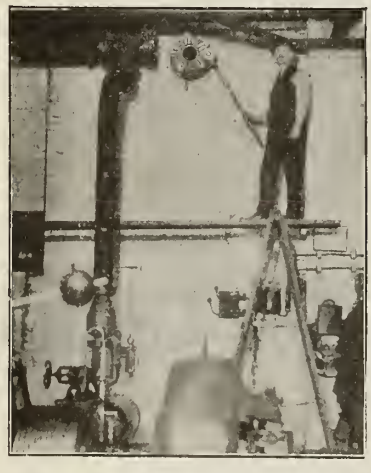
EVERY Tuec stationary cleaner means health for the user, and wealth for the sanitary engineer installing the equipment. It's easy money, sure.

CANNOT you, Mr. Sanitary Engineer, give us the name and address of a possible user? We'll help to make the sale.

Write us at once for our proposition

United Electric Co., Limited
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A "TOLEDO" at work in an awkward position.



A 6-inch pipe projecting only 10 inches through a brick wall, and 12 feet above the floor required to be threaded. It would have been a costly job to have taken it down to have the thread cut, but a "Toledo" No. 3 quickly did the job.

It took two men, only, to get the tool up on the pipe.

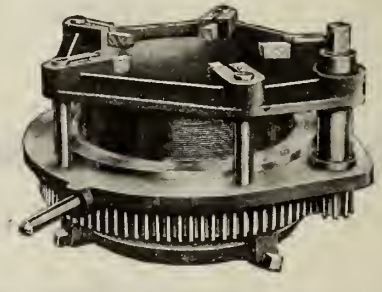
After it was up, one man easily cut the thread.

"Toledo" and "Jardine" Ratchet tools, work in any old corner.

They finish a thread at one cut, making as clean a job as if cut in a lathe.

They are made in Canada. One man does the work of two.

Write for catalog and full particulars.



"Toledo" Geared Adjustable Threading Tool No. 3

Capacity 4½" to 8" inclusive, complete with Ratchet and Driving Cross.

This tool does the work that formerly required a heavy power machine.

One man can easily thread an 8" pipe.

A. B. JARDINE & CO.

HESPELER, ONTARIO

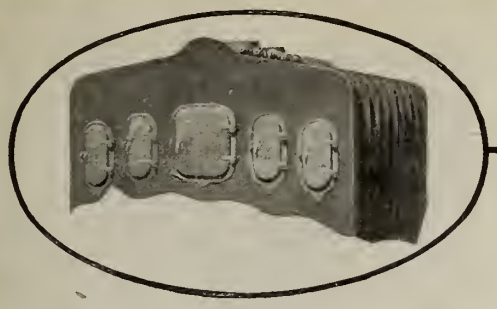
Sole makers of "Jardine" Pipe-Threading Tools.

Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.

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Lord & Burnham Co. Limited of Canada

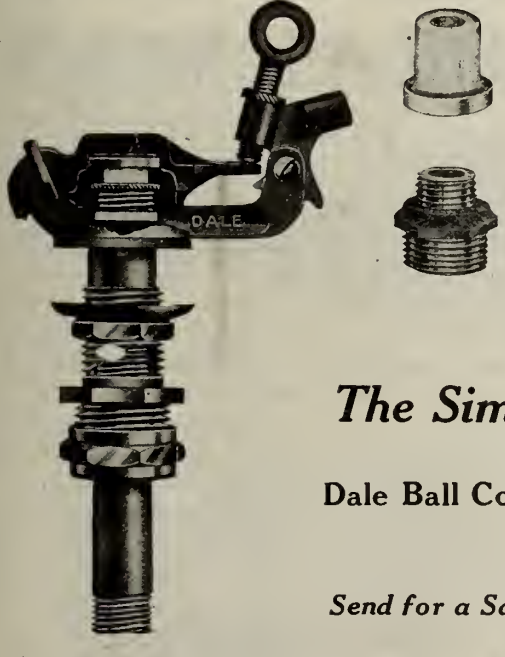
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Factory: ST. CATHARINES, ONT.

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Porcelain Seat

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With an assortment of Bushings in your kit and one "DALE," any make of Ball Cock can be replaced.

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From the time when put in service and for years after they are installed

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are a source of satisfaction to the user. With a little attention now and then, they will give permanent service and satisfaction.

They do not give out or require replacement, due to the fact that most of the wear is taken by the dependable but inexpensive JENKINS' DISC, and also because in the manufacture of the valves the most careful attention is given to every detail in design, metal and workmanship.

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SPEAKMAN quality is wrought into the Speakman Unit Fixture—in full measure. It is alone in its beautiful finish, its metal-quality, and in its convenience and adaptability. This Speakman Combination stock fixture will fit any standard enameled iron or vitreous lavatory drilled for two faucets and bi-transit waste, without any special cutting. The

SPEAKMAN UNIT

meets the requirements for a very wide range of lavatory styles, because the connecting tubes between the valves are of annealed metal that is easily shaped to suit connections. This Speakman Unit meets every requirement of the thoroughly modern combination lavatory fixture, at a very moderate cost. Buy Speakman Unit Fixtures from your regular supply house. If not yet stocked there, write us for roughing in measurements and full particulars. We will see that your wants are supplied.

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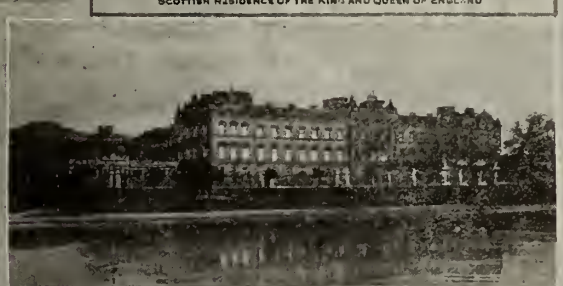
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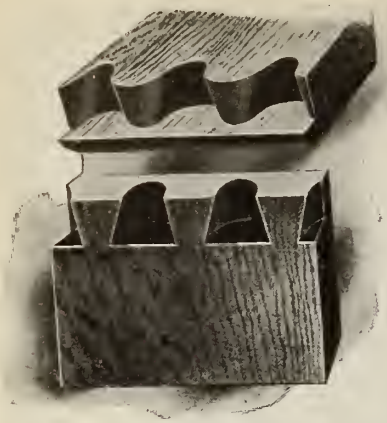
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B-O-T Hidden Lock Dovetail Joint

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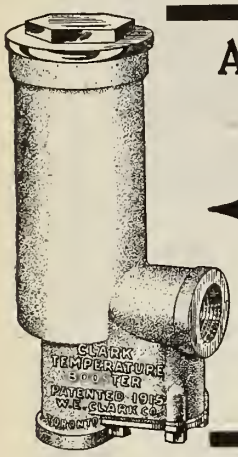
Every B-O-T W.C. tank is built of specially prepared wood, treated in such a manner as to prevent the joints from opening up.

The corners are locked with our patented, hidden dove-tail lock, and every tank bears our

FIVE YEARS' GUARANTEE.

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There's Money in Selling Modern Gas Appliances

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There is an enormous field for the sale of really efficient Gas Water Heaters in every district where a supply of gas is procurable. The sale and installation of Gas Water heaters can be made a very important and profitable part of every Sanitary Engineer's business by judicious fostering and studying their customers' needs.

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is a very neat design; in fact, it is an ornament to any room; it is positive in its operation, simple in construction, and guaranteed for a lifetime.

Install a Crandon Heat Regulator with every job. Low list, long discounts.

Write for booklet today.

DARLING BROTHERS, LTD.

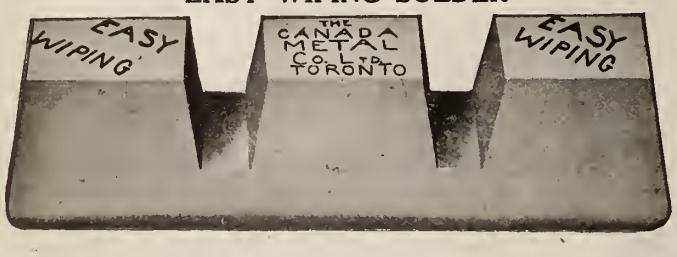
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Branches: Toronto and Winnipeg

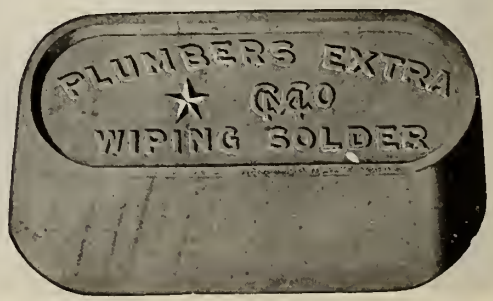
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PURE BLOCK LEAD



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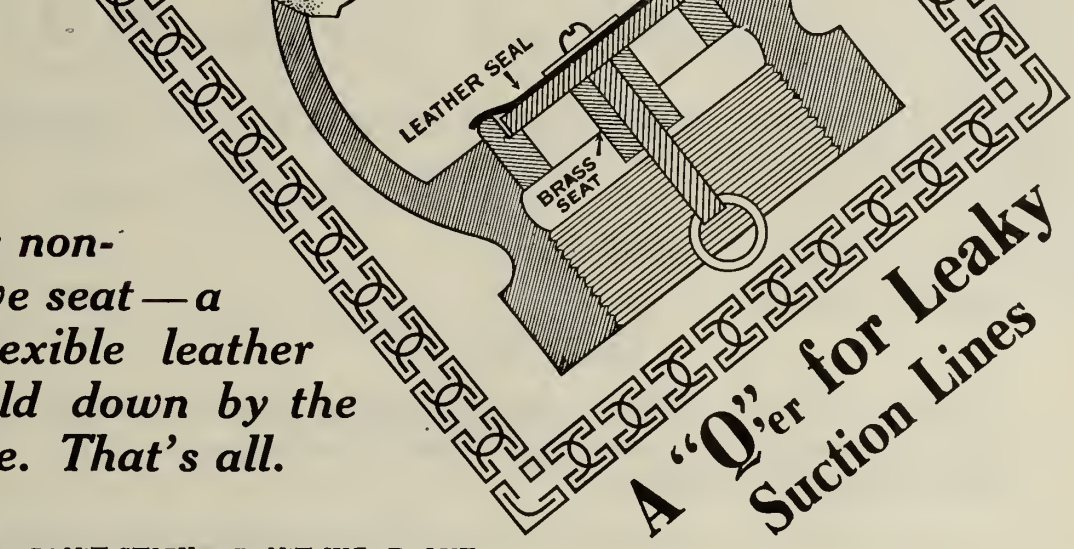
WRITE FOR CATALOGUE "A."

Peerless WATER SERVICE SYSTEMS

"Q" Foot Valves

"Just Can't Leak"

Sold by all Jobbers



A brass non-corrosive seat—a thin, flexible leather seal held down by the pressure. That's all.

A "Q"er for Leaky Suction Lines

CAN'T LEAK—CAN'T STICK—CAN'T WEAR OUT

Last summer, plumbers all over the country told us that as soon as their stock of old type Foot Valves was exhausted, they would stock up with the "Q".

We booked more orders during January than we received during the last six months of 1916—the plumbers evidently meant what they said, and "Q" Foot Valves have evidently lived up to our representations.

NATIONAL EQUIPMENT CO., Limited
TORONTO, ONTARIO

THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, FEBRUARY 15, 1917 No. 4

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It's the only way by which trouble can be overcome with the least possible inconvenience.

WHEN we introduced the VITRO NO-TROUBLE TANK to the trade, we made it possible for them to avoid all tank troubles, and from past experience, we know of nothing that is apt to cause more trouble in a house than a troublesome W.C. tank.

The only safe way to overcome tank troubles is to carry a line of VITRO NO-TROUBLE TANKS. You are prepared for all time against tank troubles, and your customers will enjoy lasting peace.

Made in White, Oak and Mahogany Finishes

Handled by Every Jobber in Canada.

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Port Hope Enamelware

PORT HOPE ENAMELWARE is made in Port Hope in the factory formerly occupied by the Standard Ideal Company.

The Plant is a large one, and the only plant in Canada which is exclusively used for making enamelware for Plumbers. While it is not working up to its capacity at the present time, the organization has been kept intact, and is preparing for the return of that prosperity which will surely come to this country after the War.

All the patterns are being overhauled and perfected. The manufacturing conditions are being improved, and the Management in all branches is bending every energy to turn out a superior class of enamelware, the use of which will make a satisfied customer for the Plumbers throughout Canada who use our goods.

If you are already using PORT HOPE ENAMELWARE, you will use no other, and you will insist on getting it from your Jobber. If not, specify PORT HOPE ENAMELWARE in your next order, and you will be impressed with its superiority in make and finish.

PORT HOPE ENAMELWARE is made in Canada, by an all-Canadian Company.

Port Hope Sanitary Mfg. Co., Limited

FORMERLY

The Standard Ideal Co.

Head Office: ROYAL BANK BUILDING, TORONTO

Works: PORT HOPE, CANADA

Branches at Toronto, Montreal, Winnipeg and Vancouver

THE SANITARY ENGINEER

VOL. XI FEBRUARY 15, 1917 No. 4

The Cost of Doing Business

Nothing Mysterious About the Subject—Only Requires a Little Thought — More Co-operation Between Employer and Employee Would Result in Mutual Benefits to All—Good Practice to Find Out Each Day's Cost of Doing Business.

BY ONE OF US.

IN the last issue of THE SANITARY ENGINEER, we published a communication from one of our readers, including a table of percentages, showing that if a certain percentage of profit was required it would be necessary to add a higher percentage than that generally allowed, as the fixed percentage of the selling price is represented by a larger sum than the same percentage on the buying price.

It is supposed by many that if we require, say, 20 per cent. profit, we would have to simply add 20 per cent. to the purchasing price, but the fallacy of such a system of calculation can easily be proved in this way: Imagine, for the sake of argument, that there are four men named Mr. Invoice, Mr. Time, Mr. Profit, and Mr. Overhead. Mr. Invoice, we will say, furnishes $100 worth of goods. Mr. Time furnishes another $100 worth of time. Mr. Overhead furnishes nothing, but he looks after Messrs. Time and Invoice, and is to some extent subject to Mr. Profit for his existence. In fact, while furnishing nothing, Mr. Overhead takes for his salary 25 per cent. on the turnover, and is expected to pay Mr. Profit 10 per cent. on the turnover. The only material or effects are the proceeds from Messrs. Time and Invoice, and a matter of 35 per cent. is required to be paid first. Because it cannot he denied that if Messrs. Profit and Overhead are engaged in the transaction, they must be paid for their part in the deal.

There must, therefore, be some sound and predetermined basis upon which all business is to be conducted, and here there is only a matter of $200 worth of tangible assets or products to dispose of. Out of these proceeds the two latter gentlemen have to receive their 35 per cent. They are in the employ practically of Mr. Time and Mr. Material, and salaries always come first in every court of law.

Now, if we assume, as we must, that this $200 worth of goods is to be sold on a percentage basis, it means that the selling price is the amount from which Mr. Overhead and Mr. Profit are to get their pay, and it might seem logical to simply add 35 per cent. to the $200, which would make the total selling price $270. Now, just note the following:—$270 is the amount of the business transaction, and it was agreed that Mr. Overhead was to get 25 per cent. on all business done and 10 per cent. was to go to Mr. Profit. How does the matter stand? Twenty-five per cent. of $270 amounts to $67.50, and 10 per cent. of $270 equals $27. Take these two from $270, and you find that Mr. Time and Mr. Invoice are not going to get their own out of the balance. There is a deficit of exactly $24.50, and somebody will have to go short.

Now, applying this illustration to the sale of goods, it is quite clear that the goods and labor, the equivalent of Mr. Invoice and Mr. Time, will have to be paid in any case, as will also overhead charges, and it will undoubtedly be your own profit which will suffer. But if you wish to continue in business, it is just as necessary that you yourself should be paid as it is for you to pay the other parties to the transaction. See to it, therefore, that you calculate your percentages of profit on a correct basis.

As has already been explained in THE SANITARY ENGINEER, if you are to make 35 per cent. to cover O. H. and profit, $200 represents 65 per cent. (100-35) of the price you must charge. Two hundred divided by 65 and multiplied by 100 is, roughly, $308, which is the correct selling price, as we can soon prove. Take from the $308, 35 per cent., i.e., $107.80, say $108, and you have $200 left as the cost price of the goods, including labor.

It is one thing to sell and another to buy, and to base one's overhead and profit upon the purchase price is a sure road to failure in business. Furthermore, no one is expected to conduct a business at a loss to himself or his source of supply. At the same time, it is very essential that the buying end should be watched, otherwise there is every possibility of the overhead expenses climbing up.

Here is how the buying end should be watched, and, as this period of the year is naturally a stock-taking time, it would be well to deal with this end of the business immediately, particularly when material is becoming more expensive every day.

In the buying end there are four elements to consider. First, how often is the stock turned over in a year, and what portion of the whole stock has to be replenished most frequently? Second, how much money is there owing for purchases? Third, what is the annual turnover in our business? Fourth, what amount of money is there always owing to one's business; in other words, what is the amount of cash receivable?

If strict attention is not paid to collections, then goods will have to be bought on credit. This constitutes item one in overhead expenses. If a larger amount of stock than required is carried, or stock is not turned over as often as it might be, then item two is incurred. This is an item which can be cut down very considerably, and no time better than stock-taking will show how this portion of one's business has been conducted. Just recently this very question came up in conversation with a reader of THE SANITARY ENGINEER, and it was found that at least $4,000 worth of stock had never been moved once during the past year. Moreover, about $3,000 of accounts had been continually on the books; none of them really very long-winded, but in such a condition that they had to be carried along. Now, here was a matter of $7,000 that was apparently required to carry on this business—an amount worth 6 per cent.

at least, and more, in fact, because, as regards the stock, a large amount would be depreciating to the extent of more than 6 per cent. and it is those unpaid accounts upon which losses are incurred. But even supposing this $7,000 carried no depreciation it involved a clear loss of 6 per cent.—$420 per year, or about $1.50 per day.

Regarding the turnover, the two former matters mentioned have a direct bearing upon the question of turnover. If collections are made often, thus enabling one to pay on demand, then the discounts can be collected, and presuming that one's stock is turned over 4 times a year by having collections made promptly, then overhead cost can be reduced by so much. Moreover, when one is in the habit of attending to one's payments he creates confidence in his source of supply to such an extent as to be given assistance from that source. Not very long ago one sanitary engineer, a good and prompt fellow with his payments, was given an inside tip on conditions regarding advances. He bought and arranged with his banker for a temporary overdraft pending making a few collections, which he did in a few days, and in this way saved several hundred dollars. Is it probable that any supply man would go to the trouble of tipping off a "slow pay" or one who did not meet his obligations on time?

So it will be seen that by paying strict attention to such items as above mentioned, one's overhead expenditure can be materially lowered, and that is one of the reasons why it is possible for the person who manages his business in a businesslike way to frequently outbid a competitor who apparently would not be incurring as high an overhead expense. The saving by good management of $420, the sum stated earlier in this article, is a matter of 2 per cent. on an annual turnover of $21,000. It is equal to 6 per cent. on a loan of $7,000 for one whole year at the bank. It would require an investment of nearly $10,000 of British war loans for a year, and the man who does not see the force of these arguments is probably working 365 days in the year to stave off a crisis. His business is his master. He is a slave and cannot ever hope to be anything else so long as such conditions exist in his mind, or are in evidence in his business.

Poor tools, the cheap kind we refer to, are often responsible for a lot of lost time. Low grade material, too, creates conditions that result in losses compounded by repeated cost of repairs that cannot be charged for.

One sanitary engineer recently called the writer's attention to certain bits of "bad luck." Upon investigation, it was found that poor tools, poor threads, vises that slipped, had put so much pressure upon pipes causing them to crack. A poor firepot, too, resulted in a lot of lost time, and so on to the end of the chapter. Two of the chief items on a job which cause unnecessary loss to sanitary and heating engineers are the handing out of too much material for a job, and poor tools. One man's time and helper cost on the average about 66½ cents on the time plus overhead. Seventy cents is the price which a banker will charge one of his clients for the yearly loan of $10, and a firepot that costs $10 will save its first cost in a month. The same with good tools. So that of all trades, sanitary and heating engineers should do all in their power to reduce their overhead. It's the only way to become successful.

Do not, however, persist in doing what thousands are doing to reduce overhead expenses, viz., working 365 days a year, and omitting some of the little items when figuring up an estimate.

Continued in next issue.

BOILER INSPECTION REPORT, DEPT. OF PUBLIC WORKS, PROVINCE OF ONTARIO

The enormous increase in the cost of steel since the outbreak of the war has affected to a considerable extent the manufacture of boilers in Ontario as elsewhere by reason of the necessary increase in the selling price. This increased cost of new boilers has created a great demand for second-hand boilers—not altogether on account of cheapness, for high prices are being paid—but by reason of their being more or less immediately available. Many old and discarded boilers which in normal times would be sold as scrap or left rusting in vacant places around our factories have been cleaned and painted and put on the market for sale by boiler dealers, a circumstance calling for extra vigilance as far as inspection goes.

A slight alteration has been made in the Steam Boiler Act, section 2, subsection D. which formerly read:—

"A portable boiler rated at 25 horse power or under, or a boiler used exclusively for horticultural or agricultural purposes." The words "rated at 25 horse-power or under" have been omitted. This change in the Act gives jurisdiction over portable boilers used in public places in conjunction with contractors' equipment, etc. Boilers of this kind formerly were not built from registered designs and were exempt from provincial laws. The fact that those boilers are often used in close proximity to hundreds of people is good reason why their designs should be of the most approved type, and also why they ought to be inspected annually.

It will be noted from the list of inspections that in addition to boilers, a number of air tanks have been examined during the past year. This inspection work was made at the request of the owners of these vessels and the customary fee of $5 per tank was paid by them. The safe working pressures were determined from the rules governing the construction of steam boilers, and the same certificates as issued for used boilers were made out for these vessels.

During the past year ten boilers have been inspected for British Columbia. Arrangements were made during 1915, whereby the inspection of all stationary boilers built in Ontario for British Columbia would be carried out by inspectors of this branch. Some trouble was experienced heretofore by manufacturers on account of their boilers being reexamined on arrival at their destination, and sometimes the safe working pressure was reduced on account of defects in the workmanship. The boilers examined during the past year have been accepted by the British Columbia authorities without being penalized in any way. During normal times the number of boilers built in Ontario for British Columbia would of course be much more than last year's total.

For some time past, and more especially since the fatal steam valve explosion at the Greey Foundry, Toronto, the work of surveying and registering high pressure pipe lines has been undertaken. The accompanying data summarises the inspection work carried out during the year ended October 31, 1916.

Drawings and Specifications Surveyed and Registered

Boilers	97
Boiler fittings	78
Pipe lines	31
Pressure tanks	6
Digestors	4
Superheaters	1
Drawings returned to manufacturers for correction	17
Registered boilers inspected during construction	313
Plates examined	1415
Plates rejected	16
Registered boilers inspected by insurance companies in the United States	35
Registered boilers inspected by insurance companies in Great Britain	4
New boilers inspected during construction for British Columbia	10
Used boilers inspected in Ontario	612
Air tanks inspected in Ontario	21
Steam drums inspected in Ontario	4
Steam plans inspected in Ontario	1
Pipe lines inspected in Ontario	4
Used boilers inspected on condemned	23
Class "A" certificates issued for new boilers	348
Class "B" certificates issued for used boilers	527
Heating certificates issued	220

Synopsis of Annual Report of the Winnipeg Plumbing and Sewer Department

Showing the Importance and Need for an Efficient Plumbing Inspection Department. The Whole Report Should Prove Very Interesting Reading to Every Sanitary Engineer in the Dominion.

THERE seems to be in the minds of many persons some doubt as to the real need of an efficient plumbing inspection department. We hear all kinds of criticisms from those who do not realize the importance of such a department to a community. Such persons require to be enlightened by those engaged in the work of installing sanitary fixtures, and a thorough study of such reports as given below, will no doubt help very materially in convincing them of the splendid work being carried on.

In the past year, 595 permits were granted for constructing, reconstructing, adding to or altering plumbing and drainage systems in buildings throughout the city of Winnipeg.

In January, 16 permits were issued, in February 32 and in the following months, to December, 1916—31, 31, 68, 86, 65, 65, 61, 63, 44, and 33, respectively.

Tests and Inspection of Plumbing

4,322 tests and inspections of plumbing were made, according to the following details, and 1,342 defects were discovered and rectified.

PERMITS GRANTED DURING 1916

Month	Permits Issued.	Connections Constructed.	No. of Inspections.
January	3	3	55
February	2	3	46
March	14	8	85
April	16	11	104
May	30	27	156
June	31	43	158
July	21	22	115
August	28	25	128
September	30	29	158
October	24	21	165
November	19	29	148
December	5	8	124
	223	229	1,436

PLUMBING INSPECTIONS

Months	Water Test.	Smoke Test.	Subsequent Inspection.	Miscellaneous.	Defects Discovered & Rectified D.
January	31	26	268	16	86
February	28	44	268	19	104
March	26	54	235	30	116
April	27	49	225	29	88
May	55	86	202	36	129
June	73	81	253	24	130
July	60	77	139	29	116
August	63	72	165	22	92
September	86	79	212	32	105
October	73	85	156	34	134
November	77	100	186	25	142
December	23	89	216	27	100
	622	842	2,535	222	1,342

Certificates

The Winnipeg building by-law of 1913 provides that no permit for occupancy of a building shall be issued until the plumbing and drainage system of such building has been inspected and tested as defined in the plumbing by-law of the city, and found to be in accordance with such by-law, and a certificate given by the plumbing inspector to that effect. In conforming with this provision 40 certificates were issued during the year to the building inspector.

In addition, 277 certificates were issued to plumbing contractors for work done by them.

Fees

Permit and license fees to the amount of $707.50 were collected.

Licenses

One hundred and thirty-three licenses were issued to master plumbers, 113 of these being renewals, which cost $1 each, and 20 being new licenses, costing $10 each.

Plumbing Installed by the City

Plumbing and drainage systems were installed in nine houses by the city, the owners being unable to afford to have the work done themselves, and the costs were charged against the properties as taxes. The following summary shows the cost of each installation:—$153, $124,50, $107.50, $119.50, $119.50, $132.-75, $132.75, $155.25, $194—a total of $1,238.75.

Sewer Connections

All sewer connections are constructed under supervision of this department. Sewer contractors working under bond are permitted to make connections in all streets, except where the main sewer is not in centre of street, in which case the city makes the connection and equalizes the cost so that owners of lots on each side of street pay an equitable amount.

When a connection is to be made in a street paved with asphalt the owner is required to deposit with the city an amount sufficient to cover the cost of cutting and replacing asphalt.

The above is a monthly statement showing number of permits issued, connections constructed and inspections made during the year:—

Licenses

Eight licenses were issued to sewer contractors.

Fees

Permit and license fees to the amount of $127 were collected.

Sewer Maintenance

During the year 684 tanks were operated with an average of 256 gallons. In addition to the sewer flushing done by tanks, there was one gang during the summer months and two gangs part of the winter months flushing with hose.

The amount of water used for flushing purposes is shown in the following table to have been 20,237,808 gallons.

In addition to general repairs made to sewers, catch basins, manholes, and flush tanks, there were 11 special cases where main sewers were repaired, such work including broken mains, defective connections, caved-in sewers, etc.

Two new manholes were rebuilt and two catch basins were also rebuilt.

SEWER FLUSHING

Month.	Tank flushing	Hose flushing	Total.
January	1,858,560	660,000	2,518,560
February	1,910,016	665,625	2,575,641
March	1,463,613	408,125	2,871,738
April	.....	.....	.....
May	91,648	110,625	202,273
June	1,036,288	576,250	1,612,528
July	1,548,288	661,875	2,210,163
August	977,408	739,375	1,716,783
September	1,198,080	758,125	1,956,205
October	1,147,472	768,125	2,185,597
November	1,634,560	753,750	2,388,310
	13,135,933	6,101,875	20,237,808

Catch Basin Work

Catch basin connections repaired, dug-out and reconstruction work amounted to 27, in all parts of the city.

Frozen Sewers and Sewer Connections

One main sewer was frozen in January, five in the month of February, one in March, and one in April—a total of eight; while the following number of sewer connections were frozen and had to receive special attention:—Five in the month of January, one in February, seven in March, and five in December—a total of eighteen in all.

Sewer Ventilation

Eighty deodorizers were operated in the three first and the two last months of the year, when the odors from the sewers are more perceptible. Generally speaking, the deodorizers have given good results, and no complaints have been received from the localities in which the deodorizers were operated.

Contraventions

Two prosecutions were instituted for contraventions of the plumbing by-law, particulars of which are herewith appended:—

No. 1—Doing work without a permit. Fine $1 and costs $3.35.

No. 2—Doing work without a license. Convicted and reprimanded.

(Signed) JAMES SMITH,
Plumbing and Sewer Inspector.

How to Keep Well

Some Very Useful Arguments Which Can be Used by Sanitary Engineers, Particularly Those Installing Sanitary Fixtures in Rural Homes.

By John W. S. McCullough, M.D., D.P.H., Chief Officer of the Provincial Board of Health.

Artesian Wells

A SAFE water supply for a town or city may be secured from artesian wells, springs, lakes, or streams, provided that certain well-defined rules regarding the source of supply are followed. Artesian wells usually give a safe supply unless the well is sunk in fissured rock which may provide a channel liable to carry pollution to the well. If the well is sunk through clay, sand, or gravel, as is commonly the case in this country, the water will as a rule be of good quality. Any chance of contamination should be guarded against by having the sides of the pipe for, say, four or five feet from the top encased in concrete, the top securely closed against outside impurities and the sections of the pipe itself screwed together.

Springs

Unless the area whence a spring drains is protected against surface pollution the spring is not a very safe source of supply. In addition to the general chances of pollution from the surface, the outflow of the spring should be protected against surface wash. At Niagara-on-the-Lake there are some very good springs in the embankment along the Niagara River. Before encampment of troops on an adjacent common the spring water is on analysis practically pure. Within a very short time after the coming of troops to the camp the water of the springs shows pollution and is unfit for domestic use. Some means of purification is necessary for a supply from springs unless the drainage area is securely protected against sewage pollution.

Streams

It is a popular idea that running water purifies itself and the ordinary observer seems to think that water passing over rapids or falls and exposed to the influence of air and sunlight rapidly loses any sewage pollution it has acquired. There is no truth in this. As an example one may cite the condition of the Niagara River water which after receiving the sewage of Buffalo, Niagara Falls, and other towns tumbles over the falls and is whirled through the turbulent rapids lower down. As a matter of fact, the water of this river, despite all the aeration and sunlight it has received, is no better at the mouth of the river than it is above the falls. It is perhaps worse because all that the great falls and swirling rapids have done for it is to mix the sewage more thoroughly with the water. If the same water were placed in a reservoir for thirty days it would be greatly improved, for the reason that time kills the disease-producing bacteria, sedimentation of solids with the bacteria occurs, and sunlight and aeration have some good effect. The water of streams is good or bad, according to the source and surroundings of the stream. A river coming from an uninhabited mountainous district is apt to be of good quality, since it is not subject to contamination by the sewage of human beings, which is, after all, the real dangerous form of pollution. If, on the other hand, the stream has its origin in populous agricultural lands, or if it flows through a district closely peopled or through towns and villages which dump sewage over its banks, the water will very likely be unsafe for use in its raw state. In many instances, however, such water may be readily purified and made fit for use. Some streams are turbid—that is, they carry mud or sand in suspension; others, notably those having their origin in peaty swamps, are colored because of the dissolved organic matter they contain. While these impurities make the water unsightly, they may not render it dangerous. Human sewage, let us repeat, is the dangerous ingredient of polluted water.

Lakes

Many urban centres take their water supply from lakes. These are subject to the same forms of pollution referred to in connection with streams. The supply of streams and lakes is maintained by the rain and snowfall which drain to them, and which in the course of drainage often carry impurities found on the

(Continued on page 15.)

Factory and Workshop Sanitation

No Investment Can Bring Better Results Than Money Spent on Sanitary Appliances in the Factory and Workshop—Sanitary Engineers Will do Well to Cater to Factory Owners.

LIVING as they do for nine, ten and more hours daily within the walls of the factory, working men are profoundly affected in their health, in their habits, and in their personal appearance, by the conditions under which they work in these factories. A sanitary shop is one in which the health of the workers is well conserved and which is cleanly, cheerful and efficient. The sanitary care of a factory and the provision of necessities and comforts for the use of employees are indispensable to industrial efficiency.

The conception of factory sanitation includes all those measures, provisions and appliances in an industrial establishment which are needed for the preservation of the health of the workers and the prevention of disease.

In view of the possible presence in every workshop of one or more employees who are victims of tuberculosis, the disposal of sputum and also the proper cleaning and disinfection of cuspidors should not be neglected. The mere prohibition of spitting is insufficient, and the posting of notices and signs has not much effect.

Inadequate provision is commonly made for washing facilities in this country, and little attention is paid to this important subject by employers. Mr. Cosgrave, of the Standard Sanitary Manufacturing Company, speaking on "Factory Sanitation" says: "The necessity for modern sanitation in the factory does not rest entirely upon the value of sanitation for hygienic reasons, but is made imperative by the fact that money is saved, production cheapened, cost of maintenance lessened, better employees secured, and their efficiencies enhanced, by the proper number and distribution of sanitary appliances. If, for instance, in a factory employing 500 men, each loses three minutes a day walking an unnecessary distance to water-closet or urinal, or waiting in line at the toilet convenience for their turns, it would mean a loss each year of over three working days for one man. Allowing an average wage of $2 per day and 300 working days in the year, then the loss from this cause alone would be $1800, annually, or an amount sufficient to pay interest at five per cent. on $36,000 for extra equipment."

It is absurd for employers to blame their employees for lack of cleanliness, if these employers do not provide proper washing facilities. In some factories, the washing facilities are so crude and antiquated, that no one could blame employees for refusing to use them.

Whether the wash basins should be put in the shop or in separate wash-rooms is a matter which must be decided according to the needs. Wherever there are a large number of women, it is essential to provide separate wash-rooms properly lighted and ventilated and kept clean. The number of wash basins with faucets for the employees depends much upon the charactre of the work, and in some industrial codes the ratio has been set at one faucet with wash basins for every fifteen employees.

In the Pullman car shops at Pullman, Ill., ten minutes before the noon hour the bell is rung and all employees are compelled to go to the central wash-rooms, where they are furnished with individual nailbrushes, soap and towels, and where they spend five to ten minutes washing, supervised by foremen. Since the introduction of this "washup" system, the number of persons suffering from lead poisoning has been reduced from seventy-seven in July, 1911, to none in July, 1912. The mere provision of wash basins and water is not sufficient to insure the proper cleansing of the hands, which is so necessary to the health of the employees in certain trades.

No part of an industrial establishment is so neglected as the toilet accommodations. In many cases they are located outside of the factory, and sometimes quite a distance from it, causing the loss of much time and also endangering the health of the employees.

In the investigations made for the New York State Factory Commission, the toilets were located in yards in 186 of the establishments inspected. In some chemical establishments I found the toilets 150 feet from the central part of the establishment. In 795 shops, the toilets were located in halls and usually kept in a grossly unsanitary condition. Many of the toilets were not separatel for the sexes and were of an obsolete and crude type.

All industrial and sanitary codes demand separate water-closet compartments for the sexes in every factory where men and women are employed. All toilet-rooms should be located within the factory building and be convenient and accessible to the persons using them. It is best to provide rooms on every floor of the establishment.

It is surprising to see how little some concerns value sanitary conveniences for their work people.

Some time ago the writer built a large factory and machine shop and installed water closets in a convenient part of the building and for two years these fixtures proved a boon to every workman, later on the owners removed the whole lot and erected outside privy closets, just because a little more room was required in the factory, there being no by-law to enforce the provision of such conveniences.

However about three months later these W.C's. were re-installed. Not merely because of the convenience to the workmen, but as time savers alone, and no doubt time is conserved too by providing adequate sanitary conveniences.

It may be argued that we sanitary engineers have not catered sufficiently to manufacturers when building their factories, very likely such is true in no small degree. But the day is not far distant we hope when every factory, building, or workshop shall be, by law provided with all necessary sanitary fixtures.

HOW TO KEEP WELL

(Continued from page 14.)

surface of the ground. In addition to the sewage impurities carried from the land, the boats carrying on navigation contribute a good deal of human excreta. This is more dangerous in the case of rivers than with large lakes. In large bodies like Lake Superior and Lake Ontario water taken at a considerable distance from the shore is quite pure. In the neighborhood of cities or large towns which frequently pour untreated sewage into the most convenient water, the supply from lakes must be effectively treated in some manner in order to make it safe for household purposes.

THE SANITARY ENGINEER

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FEBRUARY 15, 1917

PENKNIVES AT ¾d EACH

THE above heading does not appear to bear any relationship to the plumbing business, does it? But if we were to head it "Sink cocks at 35 cents," we may see something to open our eyes. However, the following article, which appeared in the Irish *Ironmonger*, simply goes to show that 90 per cent of the goods made are not what they should be:

"Mr. Sixsmith, speaking at a conference in London under the auspices of the Design and Industries Association in a discussion on 'New Aims for Commerce,' said that it was generally agreed that considerable changes were impending. That in itself was a good sign, but the official proposals were somewhat disappointing, for though they promised us plenty of science, we heard very little of artistic development. Last July, he continued, the Board of Trade held an exhibition in Manchester, which consisted of German-made goods of the cheap and nasty order. He discussed it with one of the officials present in a critical vein, who said to him that such stuff constituted 90 per cent. of the world's trade, and that we had to do that kind of thing if we were to hold our own. In that exhibition were penknives at ¾d. each. He (the speaker) contended that such articles supplied no demand whatever, and it was useless to endeavor to compete with such trash.

The Design and Industries' Association had as its object the encouragement of sound design in things made by machinery. If commercial men would only adopt its views, they would find that art meant greater efficiency and greater economy. The machine had its part to play, and it was capable of saving a vast amount of human drudgery; but, on the other hand, the man of business frequently tried to make the machine do what ought to be done by men. At the present time it was easy enough to buy things which were cheap, but sometimes it was really a problem where to discover things which were excellent."

This can scarcely be admitted of sanitary and heating goods that are made in Canada and the United States as a whole. But we do know that a poor line does get into the hands of the public once in a while.

Mail order plumbing goods and "do your own plumbing" goods never bear the stamp of high-grade quality, and if they did, poor workmanship would ruin them. So that if there is one thing more than another that our craft should always bear in mind, it is to refrain from selling inferior goods that do not bear the makers name. No one would ever believe that King George would authorize his royal insignia to be placed on a spurious piece of currency, and the same would apply in the case of a manufacturer of plumbing goods.

DEMAND GOODS OF VALUE

SUPPOSE a person intended to build a home and the following conversation took place between him and his contractor, "Well, Mr. Jones, I can build you a fine-looking eight-roomed house fitted up with plumbing and hot water heating, etc., etc., for, say, $5,000, but if you only need a six-roomed house, and wish to spend your $5,000 on it, why I can can build you a house of the very best kiln dried lumber, hard, pressed brick, one of the finest systems of plumbing and heating, the latter with a heat controlling device, and on top of that I can put you an instantaneous gas water heater in, and a stationary vacuum cleaner. In fact the house will be 'a peach,' everything you could wish for." Which of the two would appear to be the best investment? The latter, of course. That is just as it should be with all plumbing fixtures. The very best cannot be too good, but we should be able to discriminate between service and luxury. We would never dream of installing a $250 shower bath in a six-roomed house. Neither should we allow a person building a $10,000 house to get away with a sanitary system costing only $200, or installing a warm air furnace therein. We should demand that

goods of corresponding value be installed in each instance. Goods that would give the customer reasonable and equitable service in keeping with the class of home he is building, and by so doing the trade will be looked upon more favorably, the service received from first-class installations will be never-ending, and the first cost will be long forgotten, while a cheap job is never forgotten, because of there being need for endless repair bills.

THE IMPORTANCE OF SANITARY ENGINEERING

IN THIS issue the report of the year's work accomplished by the Winnipeg Sanitary Engineering Department is published. We hope to procure similar reports from other Canadian towns and cities in the future. A close study of this report cannot fail fail to show how very necessary all such work is. For instance nine houses were no doubt proved to be unsanitary, or at least unfit for human habitation, or the city authorities would not have demanded that sanitary conveniences be installed.

As many as 1,342 case of defective plumbing were detected, nearly 26 per week throughout the year. What would conditions such as those result in if not attended to at once? No one can estimate the loss involved. The report proves that the proper inspection of plumbing cannot fail to assure greater protection as time goes on to the health of Canadian citizens. It will be noted that during the year 1916 something like 4,322 tests and inspections were carried out, more than 14 per day every working day in the year.

It was nothing more or less than the lack of just such work which, 3 centuries ago, brought on the plague in London, England, and many other ancient cities. Yet in spite of these dreadful calamities which wrought such havoc, we have even medical health officers in many parts of the Dominion who treat the subject of sanitary plumbing as secondary to medicine. They even barter and bargain for cheap work, cheap labor and cheap material. Many medical men are there in our rural districts who have cesspools installed, because a septic tank costs a few dollars more. Some of these medical men even accept positions as district health officials, and do little or nothing towards seeing to it that plumbing fixtures and sewage disposal systems are properly installed.

* * *

Further discussing this important subject, and asking how things can be remedied, it might be suggested that the work should be taken out of the medical health department, but we do not on the whole agree with such a suggestion. What we would like to see established, however, is an engineering department in connection with the health department. There is a nursing department, and several other matters governed by their respective departments, why not an engineering department. And the time was never more opportune than at present, as we stated several weeks ago. We shall have a big lot of wounded soldiers on our hands very soon. Hundreds of these men are practical sanitary engineers. Appointments could be made in every district, and these men given the work of inspecting all plumbing work installed in their districts. They could do splendid work and would also keep the standard of plumbing up to such a grade as would always ensure sanitary surroundings.

If their practical experience is not used, all their training has been wasted, at least in the case of young men. The Dominion government is establishing vocational training schools with a view of making these wounded soldiers independent. There can be no argument against the government taking advantage of the knowledge which many of these men already have, and particularly when the country really wants just such work done. It is just as essential to have our rural surroundings kept in a sanitary condition as those of the city. Each home is in itself a little community, why allow unsanitary surroundings to prevail as is frequently the case to-day?

THE SANITARY ENGINEER is open for the discussion of any such problems as will raise the standard of plumbing installations, in our rural districts to at least as high a degree of perfection as is found in most of our Canadian cities.

THE WEST—AND THE CASH BASIS

THEY are acquiring the habit of discussing live questions, out West. For instance, the Winnipeg Board of Trade will shortly discuss the question: "Can retail merchants put their business upon a cash basis?"

The reason for bringing up this subject is that they are becoming convinced that the credit system has been productive of an enormous aggregate of bad debts, and that retail prices have, as a consequence, had to be loaded, this addition to prices having to be borne by those who do pay. This same condition prevails in the sanitary and heating trade; irresponsible men procure credit, conduct their business poorly, which results in loss. The trade as a whole has to bear this loss.

New Canadian Patents

Harry S. Dodd, Toronto, Ontario, Canada, 25th July, 1916; 6 years. Filed 3rd May, 1916. Receipt No. 265,012.

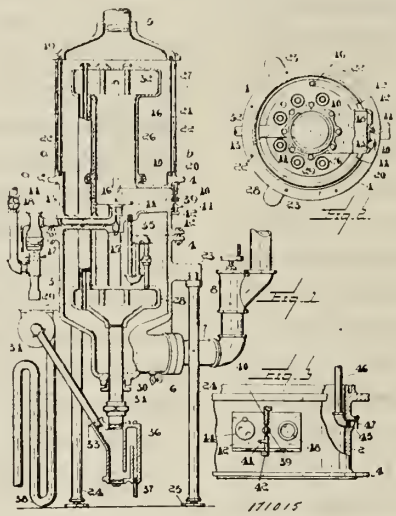
Claim.—1. In a heater the combination of a tubular closed combustion chamber, a gas burner located adjacent one end of the chamber, a closed expansion chamber or header of greater cross sectional area than the combustion chamber and into which the other end of the combustion chamber opens, means for supplying a combustible mixture to the burner, and an air pump adapted to exhaust the products of combustion from the expansion chamber.

2. In a heater the combination of a tubular closed combustion chamber, a gas burner located adjacent one end of the chamber, a closed expansion chamber or header of greater cross sectional area than the combustion chamber and into which the other end of the combustion chamber opens, means for supplying a combustion mixture to the burner, a plurality of fire tubes connected to the expansion chamber, and substantially paralleling the combustion chambers, a header to which said tubes are connected, an exhaust flue connected to said heater, an air pump connected with the exhaust flue.

3. In a heater the combination of a tubular closed combustion chamber, a gas burner located adjacent one end of the chamber, a closed expansion chamber or header of greater cross sectional area than the combustion chamber and into which the other end of the combustion chamber opens, means for supplying a combustible mixture to the burner, a plurality of fire tubes connected to the expansion chamber and substantially parallelling the combustion chamber, a header to which said tubes are connected, tubes for the passage of a fluid to be heated extending through the fire tubes to the outer surface of the expansion chamber and header, an exhaust flue connected to said header, and an air pump connected with the exhaust flue.

4. In a heater the combination of a tubular closed combustion chamber, a gas burner located adjacent one end of the chamber, a closed expansion chamber or header of greater cross sectional area than the combustion chamber and into which the other end of the combustion chamber opens, means for supplying a combustible mixture to the burner, a plurality of fire tubes connected to the expansion chamber and substantially parallelling the combustion chamber, a header to which said tubes are connected, an exhaust flue connected to said header, a trapped pipe for water of condensation leading from the bottom of the combustion chamber to the interior of said header, and an air pump connected with the exhaust flue.

5. In a heater the combination of a tubular closed combustion chamber, a gas burner located adjacent one end of the chamber, a closed expansion chamber or header of greater cross sectional area than the combustion chamber and into which the other end of the combustion chamber opens, means for supplying a combustible mixture to the burner, a plurality of fire tubes connected to the expansion chamber and substantially paralleling the combustion chamber, a header to which said tubes are connected, an exhaust flue connected to said header, a trapped pipe for water of condensation leading from the bottom of the combustion chamber to the interior of said header, and an air pump connected with the exhaust flue.



No. 171,015. Heater.

6. In a heater the combination of a tubular closed combustion chamber, a gas burner located adjacent one end of the chamber, a closed expansion chamber or header of greater cross sectional area than the combustion chamber and into which the other end of the combustion chamber opens, means for supplying a combustible mixture to the burner, a plurality of fire tubes connected to the expansion chamber and substantially parallelling the combustion chamber, a header to which said tubes are connected, an exhaust flue connected to said header, a trapped pipe for water of condensation leading from the bottom of the combustion chamber to the interior of said header, a condensation chamber with which said exhaust flue connects, a trapped liquid outlet therefrom, and an air pump connected with the exhaust flue.

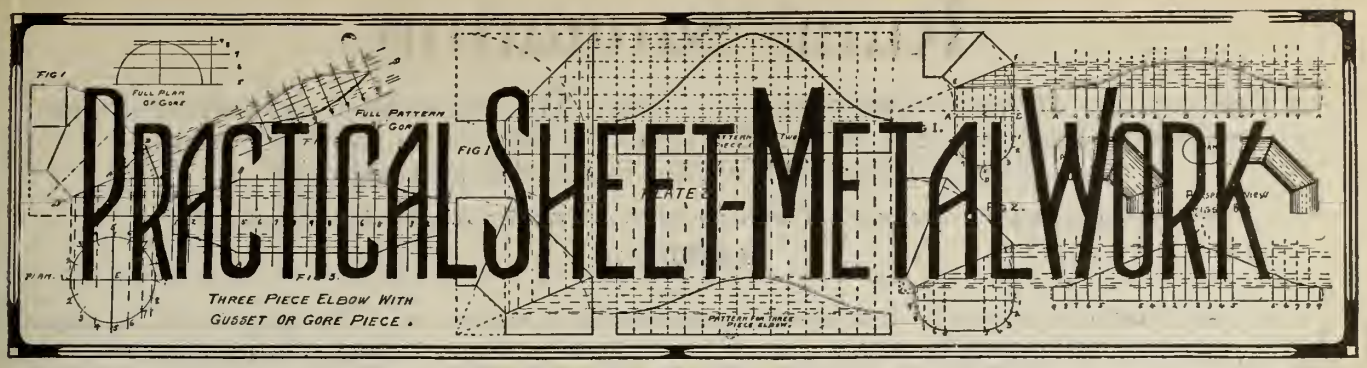
7. In a heater for fluids the combination of a substantially vertical outer casing, provided with a fluid inlet and a fluid outlet, a closed combustion chamber located in said casing intermediate of it sends, a lateral extension of the combustion chamber near its lower end extending through the casing, a door adapted to effect a substantially air-tight closure of the outer end of said extension, a burner located in the combustion chamber adjacent its lower end, means for supplying a combustible mixture to the burner, a header into which the upper end of the combustion chamber opens, a header located below the combustion chamber, means for the passage of the products of combustion extending from the one header to the other about the chamber, and an exhaust flue from the lower header leading through the lower part of the casing.

8. In a heater for fluids the combination of a substantially vertical outer casing, provided with a fluid inlet and a fluid outlet, a closed combustion chamber located in said casing intermediate of its ends, a lateral extension of the combustion chamber near its lower end extending through the casing, a door adapted to effect a substantially air-tight closure of the outer end of said extension, a burner located in the combustion chamber adjacent its lower end, means for supplying a combustible mixture to the burner, a header into which the upper end of the combustion chamber opens, a header located below the combustion chamber, means for the passage of the products of combustion extending from the one header to the other about the burner, a trapped pipe for water of condensation leading from the bottom of the combustion chamber to the interior of said header, and an exhaust flue from the lower header leading through the lower part of the casing.

NEW ESTABLISHMENT

The friends of A. W. Lord, who for many years was in charge of a very important department in the factory of the late Standard Ideal Sanitary Mfg. Co., Port Hope, will be interested to know that he has started in business on his own account at 706 Pape Ave., Toronto.

He is a practical man of many years experience, and will no doubt do well in this his new venture. THE SANITARY ENGINEER begs to join his many friends, in wishing him every success.



BY THOMAS STANFIELD

THE patterns necessary for a branch pipe are required. The main pipe and branch both being the same diameter. Fig. 1. let E F G H L M N O P be the elevation, with A B C D the plan of main pipe and J K the plan of the branch piece.

First divide plan A B C D into equal parts 1, 2, 3, 4, 5, 6, 7 and repeat until the whole of the circumference is divided. Next draw dotted lines down until they intersect the joint at L M N.

Now divide plan of branch piece J. K. in the same manner as was adopted in plan A B C D.

Next draw dotted lines upwards from 1, 2, 3, 4, 5, 6, 7 plan J K until they meet the dotted lines drawn from plan A B C D. These lines should meet at the joint L M N.

The next step to take will be to draw stretchout lines, as shown in Fig. 2 and Fig. 3 respectively.

First draw the stretchout line Fig. 2 as shown at F E H G. These points give the total length of main pipe.

Now transfer the measurements on plan A B C D. 1, 2, 3, 4, 5, 6, 7 and repeat backwards, making 7 on line H, G the centre.

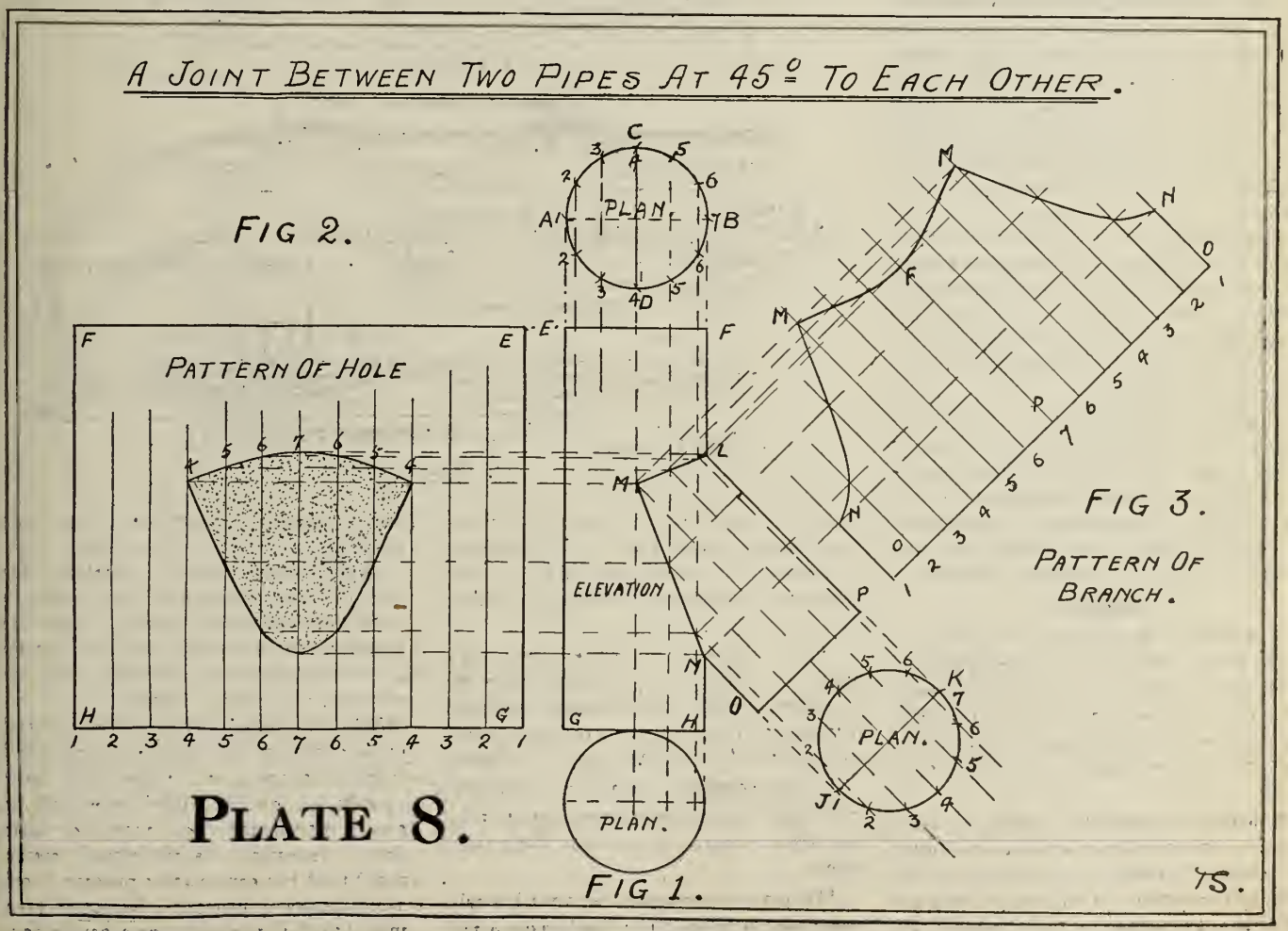
Next draw the stretchout line for pattern of branch piece as shown by line O P O Fig. 3. and transfer the measurements from plan J K 1, 2, 3, 4, 5, 6, 7 repeating these backwards in same manner as was done in Fig. 2.

Now draw a number of dotted lines 4, 5, 6, etc. on both the stretchout lines in Fig. 2 and 3.

From line 7 Fig. 2 draw horizontal line until it meets point L on elevation, and repeat by drawing lines from 6,6 Fig. 2 to intersections on M L elevation until the four lines are drawn.

Next draw three more dotted lines from 5,5 6,6 and 7,7 Fig. 2, to the intersections on joint line M N. The points where these horizontal lines, cross the vertical lines 1, 2, 3, 4, etc. Fig. 2 as shown by the shaded portion is the pattern of the hole required for the branch.

(Continued on page 30)



Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 18

OF the recent bulletins published on the subject of rural sanitation, there has been chosen for review in this article one of the University of Missouri Engineering Experiment Station Series. It was compiled by William C. Davidson and is entitled, "Sanitation and Sewage Disposal for Country Homes." The object of the Experiment Station established in 1909 is "to be of service to the people of the State of Missouri" by investigation and research in engineering lines. The object and scope of this particular bulletin issued in 1910 is explained in the introduction as follows:—

"The demand for modernly equipped farm homes at a moderate cost is becoming an urgent one. Farmers throughout Missouri are striving to keep abreast of the times in modern methods of agriculture. Likewise they are seeking the latest and best practices in every line of activity pertaining to the industry of farming.

They are demanding that their homes be equipped with the same modern conveniences that the people of a city enjoy, and it is the call from them for information on modern farm sanitation that has led to the publication of this bulletin.

The greater part of the bulletin is devoted to the subject of modern sewage disposal plants for isolated houses. A portion has been given to the discussion of sewage disposal methods now employed on the farm, and still another portion to country plumbing.

The "I'm from Missouri.—You've got to show me" attitude would seem to apply to this bulletin for, as will be noted, the writer takes precaution to give his reasons or references for objecting to cesspools and for advocating a more sanitary method of sewage disposal:—

Cesspools

The general definition of a cesspool is a tank into which the house sewage is discharged, said tank retaining the solid and sometimes the liquid matter until removed. There are two types of cesspools, viz., leaching and tight cesspools.

The leaching cesspool is built of loose brick or stone without the use of cement or mortar. Through the crevices in the side of the cesspool the liquids leach out into the surrounding soil, leaving the solid matter to remain in the cesspool until removed by pumping or by similar means.

The tight cesspool is built of brick or concrete, it being essential that the cesspool be water tight. The liquid is removed by being drained out through a drain pipe. The solids are removed as in the leaching cesspool.

The writer quotes from the following authorities in regard to the unsanitary conditions of cesspools:—

"Sparkling water may not be pure. It may contain typhoid germs. The filtration of sewage effluent does not purify it, although it may clarify it. It requires the action of oxygen and light to render sewage harmless."—Burton T. Ashley.

"It is hopeless to depend upon the purifying influence of intervening soil to protect wells from cesspool fouling, because soil filtration, in order to be effective must be intermittent."—Mason.

"The cesspool is a relic of medieval shiftlessness and carelessness for which no excuse can be offered."—Dr. Bashore.

"The privy or cesspool is walled with loose stone so that the liquid waste may leak through them into the surrounding soil. The result of this is a gradual increasing pollution of the soil and often a neighboring spring or well becomes so contaminated as to spread disease."—Prof. Merriman.

The Septic Tank

The modern septic tank, sometimes called a scum tank or putrefaction tank, consists essentially of a water-tight chamber of suitable capacity through which the sewage flows slowly, and almost continuously, the inlets and outlets being submerged to prevent an undue disturbance of the surface scum.

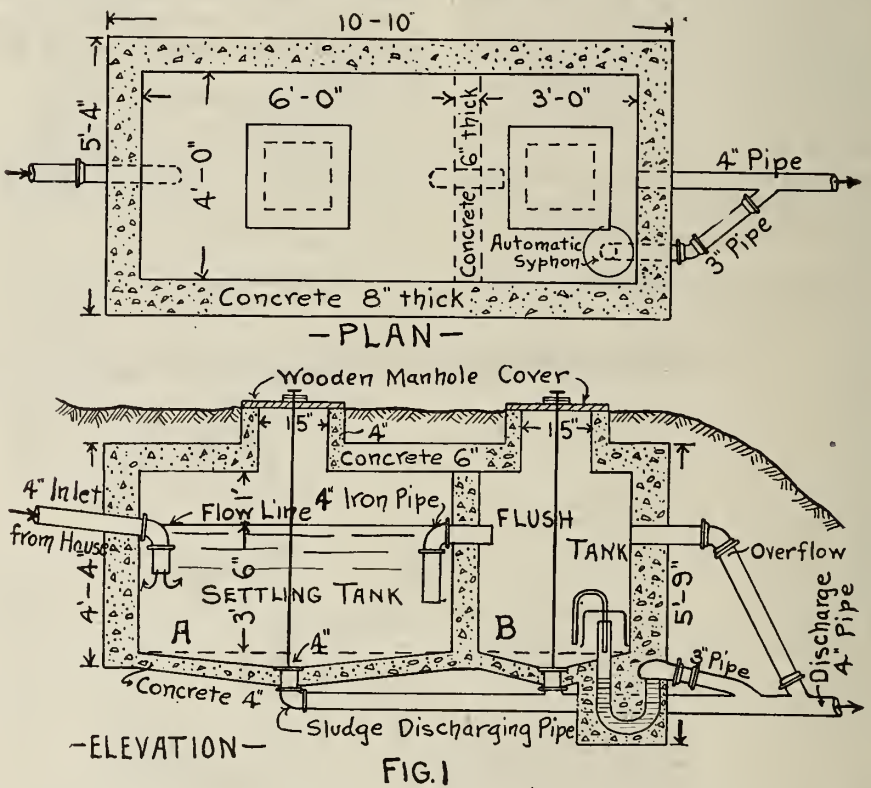


FIG. 1

Countless numbers of bacteria harbored in the surface scum and living upon the solids in the sewage, cause the liquefaction. All solids settle to the hottom of the tank from which they are removed at frequent intervals.

While the liquid waste from the septic tank contains but little solid matter it is highly charged with putrescible matter in solution, and the liquid gives off bad odors, particularly on warm or damp days. It cannot be sufficiently emphasized that the septic tank process is only a preliminary process of sewage treatment, that the wastes from septic tanks are neither clarified or purified, that they

contain all the dissolved organic substances which are the chief cause of contamination of lakes and streams and that a further purification in most cases is necessary.

No septic tank shows good results when first put in operation. It is necessary that the process be carried on for several weeks before it becomes efficient. The claims that all suspended impurities are liquefied and that there will be no increase in the deposit of solids or in the scum in a septic tank have not been realized. On an average only from thirty to fifty per cent. of the suspended solid matter is destroyed, partly by liquefaction and partly by changing it into gas.

The capacity of the septic tank should be made in size about three-fourths the daily volume of the sewage. Otherwise the tank acts as a mere settling chamber. On the other hand, the tank should not be too large, as the sewage remains too long in the tank. By the use of two tanks in series the capacity of each tank may be reduced.

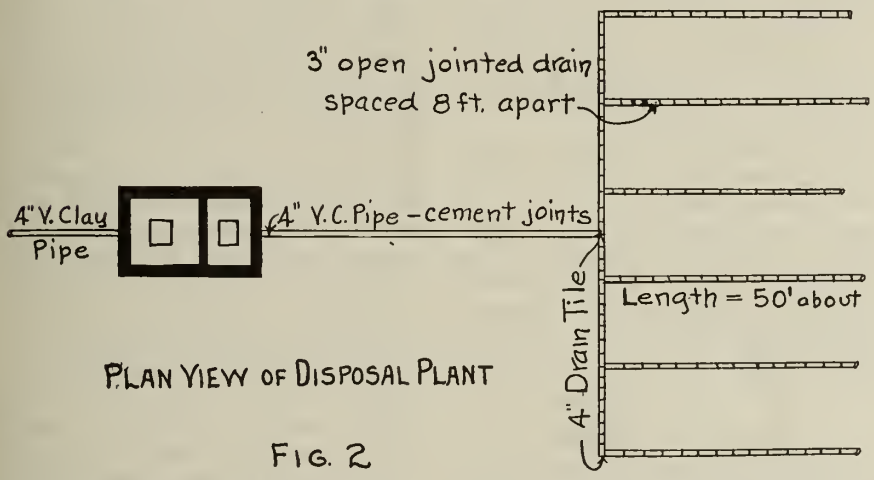
For isolated buildings it is preferable to use covered tanks, notwithstanding the fact that open tanks have been found to be quite satisfactory. Reasons for this are: that bad odors are confined within the tank; the sewage scum is concealed from sight; the surface of the sewage in the tank is protected from the wind rain and snow; but, most important of all, the probable infection of food in the house by flies is prevented.

Fig. 1 shows a concrete septic tank which is designed large enough to provide for the sewage disposal of a family of six.

The tank operates as follows: Sewage enters tank "A" through a four-inch inlet pipe from the house. A heavy scum will form over the surface of the liquid, and beneath this scum the sewage is liquefied by the action of the bacteria which develop or grow in the surface scum. For the successful growth of culture of these bacteria, the scum must not be frequently broken or disturbed, hence the inlet pipe is made to discharge below the surface of the liquid. For the same reason the overflow pipe from tank "A" to tank "B" is extended below the surface to about the middle of tank "A" where the liquefaction of the sewage is complete.

In the sludge discharge pipe provision is made for cleaning out the sludge from the settling tank without putting it out of service, and, furthermore, provision is made for the discharge of the contents of the tank during a time when it may be found necessary to repair the syphon.

A six-inch partition should separate tank "A" from flush tank "B." The liquefied sewage flows from tank "A" to flush tank "B," from which it is removed by means of an automatic syphon, which is so designed that it will discharge when the sewage reaches a certain height in the flush tank. This syphon should be so arranged that it will discharge the liquid twice every twenty-four hours. This syphon action will take place when the tank is receiving a flow of three hundred and sixty gallons (U. S.) per day.



PLAN VIEW OF DISPOSAL PLANT

FIG. 2

To provide for the entrance of air into tank "B," which is necessary for the successful operation of the syphon, and also to provide for an overflow of sewage in case the syphon becomes clogged and refuses to discharge the contents of tank "B," an overflow pipe is connected to the main discharge pipe as shown in Fig. 1.

A valve is placed in the bottom of the flush tank "B" to provide for the removal of sediment which in time may collect there.

Subsurface Disposal of Sewage

In septic tank sewage disposal systems, as in all others of whatever nature they may be, some provision must be made for the effluent after it leaves the tank. If it is allowed to flow out upon the ground continually, a nuisance will soon be created, which may endanger health. In the absence of running streams into which to empty it, some other means of disposal must be resorted to. Perhaps the one of universal application is the subsurface disposal scheme. This plan may be successfully used whether the ground be level or sloping. In fact, it is about the only method that may be used in a flat country.

Subsurface disposal means the disposal of the liquid sewage through a system of open-jointed drain tile laid from eight to twelve inches below the surface of the ground. The open joints should be from ¼ to ½ in. apart, covered with some material to prevent loose earth from falling back into the pipe during the backfilling of the ditch. The length of the drain pipe will depend upon the amount of sewage and character of the soil. An intermittent discharge is essential, hence the necessity of an automatic syphon. For the lateral drains a three-inch tile is ordinarily used.

It is evident that such a system of disposal requires the effluent to be a liquid, otherwise the drain tiles would soon become clogged and stop the operation of the plant.

Fig. 2 shows the arrangement of a typical subsurface disposal system. The plan view illustrates the method of arranging the drain tile. The distance of the septic tank from the house is about one hundred feet, and from the septic tank to the disposal field approximately one hundred feet. Local conditions will govern entirely as to the location of the tank and the disposal ground. In no case should the tank be closer to the house than one hundred feet.

The pipe connecting the septic tank to the house should be a four-inch vitrified clay pipe, with bell and spigot joints carefully cemented. The four-inch pipe connecting the two tanks is to be arranged as shown in the drawing, Fig. 1.

The pipe line connecting the flush tank with the disposal ground is to be a four-inch V. C. pipe with cemented joints and laid to a grade of at least one-fourth inch to the foot.

The main traverse drain tile should be four inches in diameter laid level with cemented joints. It is necessary that this tile be laid level in order to secure an equal distribution of the sewage to the laterals. The lateral drains should be three inches in size, laid in rows about fifty feet long and eight feet apart, and laid to the grade of one inch in twenty-five feet.

For a family of six people from 150 to 200 feet of drain tile will be necessary in a loose soil. In a compact clay soil, a much greater length will be needed, probably 300 to 400 feet.

The septic tank shown here consists of a settling tank and a flush tank pro-

(Continued on page 23.)

Practical Sanitary Engineering

The First Course of Its Kind Ever Published in Canada—Specially Prepared for the Craft Coming Up, as Well as Those Who in These Days Construct Work Simply Because the "By-law Says So"

BY THE EDITOR.

THE last article dealt principally with the question of expansion of water proving in many ways that heat is energy.

The B. T. U. was referred to, but not in such a way as to properly define what a B.T.U. really is, neither was steam defined.

The following definitions will not be out of place here, though they really would be of greater interest to the heating engineer. Nevertheless, sanitary engineers should be acquainted with the main principles of heating and with the various terms and definitions used in connection therewith:

Steam

Steam is water vapor or is water changed to the gaseous form by heat.

Heat

The intensity of heat is measured in degrees by means of a thermometer. The Fahrenheit or F. thermometer is used almost entirely in this country.

B.T.U. Defined

A British Thermal unit or a B.T.U. is the amount of heat required to raise one pound of water one degree F.

This quantity of heat is different for different substances. Thus, it takes less than a B.T.U. to raise one pound of copper one degree F., but water is used as the standard

Consider one pound of ice at the freezing point. It requires 144 B.T.U. to change the one pound of ice at 32 degrees to one pound of water at the same temperature, and the temperature of the mixture cannot be raised until all the ice is melted. To heat the water to the boiling point will require approximately 180 B.T.U. or one B.T.U. for every degree rise in temperature. If heat still be added, the water will not become any hotter, but a quantity of it will be changed to steam.

To change the whole pound of water to steam will require 966 B.T.U. Part of this heat is used up in expanding the steam against the pressure of the atmosphere, but the most of it is, like the heat used in melting ice, used up in changing the condition of the substance. As long as any water is present, the steam is known as saturated steam, and the temperature of the mixture cannot be raised above the boiling point, or 212 degrees F. When evaporation is complete and still more heat is added, the steam becomes hotter than 212 degrees and is called superheated steam.

Saturated Steam

Saturated or wet steam is steam in contact with water no matter what its pressure may be or it is steam whose temperature is the same as the temperature of the boiling point corresponding to its pressure.

Superheated Steam

Superheated steam is steam whose temperature is higher than the temperature of the boiling point corresponding to its temperature. To bring it to this condition, it must be superheated out of contact with water.

As the thermometer has been referred to it might not be out of place to say a word or two about it.

Many people think that Gabriel Daniel Fahrenheit was the inventor of the thermometer. This is a popular error. What he did do was to substitute mercury (quick silver) in place of spirits of wine or pure alcohol in the tube of which the thermometer consists.

The Air We Breathe

As stated in a previous article, air, is also a form of gas, or shall we say a combination of gases, it has no form.

It is found in almost every natural substance, it is the vital element upon which we live, and is compressible, great weights can be sustained by air that is confined in a tight vessel. We have a practical demonstration in pneumatics when we compress air, or use air in any way as a motive power, just as we illustrate hydraulics by water power.

Air is composed of oxygen and nitrogen. Professor W. B. Kemshead in his book entitled inorganic chemistry gives a short history of the discovery of oxygen as follows:

"Oxygen was discovered by Priestley, Aug. 1, 1774 and called by him Dephlogisticated air; it was also discovered soon afterwards by Scheele in Sweden, who, however had no knowledge of its previous discovery by Priestley.

Scheele gave to it the name of "Empyreal Air." Lavoisier, in giving it the name "Oxygen" did so under the idea that it was the acidifying principle in all acids; and although we now know that this idea is a false one, we retain the name, as it is both sufficiently distinctive and expressive. Professor Kemshead defines oxygen in the following terms:—"Of all known substances oxygen is the most widely distributed throughout nature, constituting at least three-fourths of the terraqueous globe. It occurs in the free state in the atmosphere we breathe of which it constitutes 20 per cent. (1-5) by volume, or 23 per cent. by weight. It occurs, combined with hydrogen, in water, forming eight-ninths of that fluid. It is found in most mineral bodies probably forming one-third by weight of the solid crust of our globe, for silica, carbonate of lime, and alumina (clay) the three most abundant constituents of the earth's strata—contain each about half their own weight of oxygen; and finally, it is found in almost all animal and vegetable compounds, being an essential constituent of all living beings."

Air as it exists around us is more or less saturated with moisture, at Zero we find the air contains only about 3 per cent. humidity, which accounts for our feeling cold in a house we will say at 65 degrees Fahr., in which no moisture has been added. Thus on a June day at 65 degrees Fahr., when the sun is evaporating the snow or water in the ground from spring showers, we find the air is warm or rather it is highly charged with moisture.

While all life requires air, it also requires moisture. Dry air is always "hungry," still air not so much so. As an illustration of this, a person perspiring will find that by fanning one's self the moisture, or perspiration will quickly disappear just as when a wet cloth is put out to dry on a still day, it will be found that it will take a longer time to dry than on another day, when the temperature is the same, but when there is a certain amount of wind.

Atmospheric Pressure

While we often refer to a vessel, boiler or any other closed receptacle as being empty, the term is not a true one, For instance, take a glass jar, see Fig. 1, with a small cock fitted to the bottom and a strong piece of sheet elastic tightly fitted to the top, upon the elastic (which should be stretched very tight) place a weight, it will be found that the enclosed air will hold up the weight to a certain height. Now attach a small

pump to cock which is still open and give the pump a few strokes, thus pumping the air out of the jar, see Fig. 2. It will be found that the weight will gradually lower at each stroke. Now close the cock, take off the pump and again open the cock very slowly, it will be found that the weight will rise to position shown in Fig. 1.

Now, what does such an experiment prove? Simply that, when pumping the air out of the jar, the sustaining power of the air in the jar was taken away, and the full pressure of the air was bearing upon the weight. Take off the weight and repeat the operation, and it will be found that the elastic will have the appearance of being drawn into the jar. In actual fact, such is not the case. A proof of this is given in the following manner. Take an ordinary galvanized expansion tank that has collapsed when

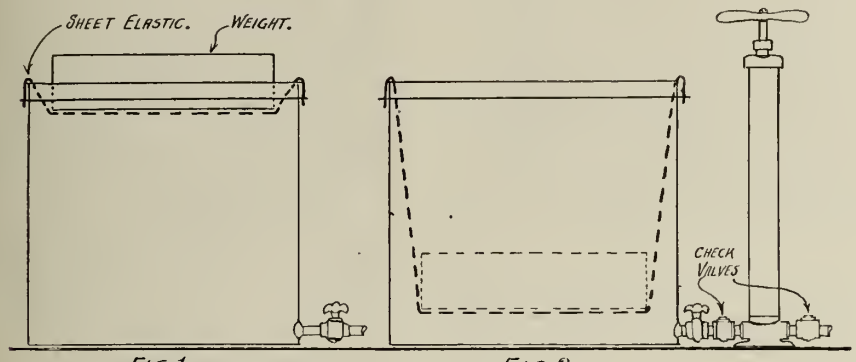


FIG 1 FIG 2

in use. What caused it to collapse? Several things may have been the cause, but one thing we must bear in mind and that is, that the atmosphere pressure inside the tank had in some way or other been expelled, and no more could get in, therefore, there being no atmospheric pressure in the tank the atmospheric pressure outside caved in or exerted 15 lbs. pressure on the outside.

Take another simple illustration which every school boy has seen. Fill a glass tube with water, place the finger over one end, turn the tube upside down, and the water will not empty. What is really taking place? Simply the 15 lbs. or to be correct 14.7 atmospheric pressure is holding up the column of water.

Syphonic action is simply another proof of the power of atmospheric pressure. If a bent glass tube is filled with water, one leg of the tube longer than the other, yet held at the same level, then reversed, the short leg being immersed in a vessel of water, the vessel can be emptied. This is because the longer leg had a slightly greater quantity of water in it, and thus unbalanced the atmospheric pressure exerted on the face of the water.

The ordinary W.C. tank gives us another illustration of the power of atmospheric pressure, though few sanitary engineers ever take notice of it. It is not particularly the head of water that causes the water to flow through the flush valve when the lever is tripped, and the flush ball raised. How do we know this? Because if we take the same flush valve and the same supply, with the water turned off, and make the tank air tight, the flush valve operated in the same way will not cause the water to flow out of the tank, thus proving that it is the atmospheric pressure exerted on the surface of the water, as well as the slight head approximately one half lb. to the foot that is responsible for the tank being flushed. So that it will be seen that atmospheric pressure is something which sanitary engineers have to contend with, and to a much greater degree than has yet been explained.

The more study given to these subjects, the more interesting this series of articles will prove, and at the same time we shall learn that we do many things for very good reasons and not merely because certain by-laws require them to be done.

(Continued in Next Issue.)

RURAL SANITATION

(Continued from page 21.)

vided with an automatic syphon. For the details of construction see Fig. 1.

Approximate Cost of Septic Tank

Cement, 22 sacks at 40c	$ 8.80
100 ft. 4 in. V. C. pipe at 8c	8.00
10 ft. 3 in. V. C. pipe at 6c	.60
40 ft. 4 in. V. C. pipe at 4c	1.60
150 ft. 3 in. drain tile at 3c	4.50
Automatic syphon	15.00
Incidentals	5.00
Total	$43.50

As will be noted above, no estimate of the cost of sand or gravel has been made. In most farming communities this may be obtained from creeks or branches nearby at the expense of hauling.

(Continued in next issue).

PLUMBING DEPRECIATES VALUE OF PROPERTY

One could scarcely imagine that the addition of a bath to any house depreciated its market value. Such was the case, however, in a recent instance in Birmingham, England, where houses were valued at £10 less with a bath fitted than without one, the reason being that the water rate was 6s. per annum more with the bath than without it. It was also assumed that the baths would cost a certain sum for repairs every year. It is a little disturbing, on the grounds of both morality and business, that any legislation should adversely affect the installation of such a desirable fixture.

This must appear strange to the average Canadian. It would appear that if property is thus depreciated rents would be lower. Such, however, is not the case in England. Houses furnished with a bath are generally rented for as high as 25 cents per week more than a house without bath.

The above story about the bath reminds one of a conversation between a Canadian and Irishman. The former was paying a visit to Ireland and remarked that he felt uncomfortable because he was accustomed to have a bath every morning when in Canada.

Says Pat, "Phwat would you be doing all day to be needing a bath every morning? Do you never have the bed clothes washed, or do you not wash yerself before yer goes to bed? Ayther that, or else you Canadians must be a dirty lot shure to be needin' a bath every mornin'."

SPECIAL SANITARY BULLETIN

Readers of THE SANITARY ENGINEER will be interested to know that a new special bulletin is being issued by the American School of Correspondence Drexel Ave. and 58th St., Chicago, in connection with their sanitary and heating engineering course.

Professor Arthur Bateman was appointed director of this department on account of his proved fitness for the position. He is heart and soul in the work and has so far had a splendid career.

Under his direction, those who take the advantages promised in this new bulletin cannot fail to succeed. Thousands there are of splendid fellows in the sanitary heating and ventilating profession to-day that would be far more successful at less physical and mental cost to themselves, were they blessed with a proper training, such as could not be procured in the earlier days.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Another advance approximating from 5 to 10 per cent. has become effective in the price of boiler tubes. Lead pipe and waste pipe have advanced 1c per pound. Lead wool has also been increased. Lead sheets have advanced 1¼c per pound. All brands of solder have made big advances, the increase being from 4c to 5c per pound. The firmness in this market is due to the conditions in the primary markets for the component metals that enter into the manufacture of solder. Solder wire is firm at the highest prices given in previous quotation. Asbestos packing, millboard and boiler covering are all in firm market. The situation in almost all lines of asbestos goods is becoming more acute owing to the scarcity of the raw materials. Some lines, such as asbestos millboard, are off the market entirely with some concerns. Boiler gaskets are in big demand and prices are firm. Stillson and Trimo wrenches have advanced 10 per cent. New pump discounts provide for a higher price. Old heavy copper is in firm market and higher prices are being paid by dealers in old metals for this commodity. Galvanized sheets and corrugated sheets are in a strong position. Dealers report a fairly good trade developing for buildings in small centres and for goods for munition plants.

TORONTO, Feb. 14.—Prices in many lines of goods carried by the plumbing trade have moved in an upward direction since last issue. Among these can be noted boiler tubes, lead and zinc products, old metals, wrenches, pumps, asbestos goods. Difficulty in getting deliveries of raw materials is affecting the production in many lines. Raw materials are scarce and where they can be obtained the railway situation operates to curtail production. Short supplies of coke and coal are also becoming a serious factor with some concerns. Stocks which they carried in anticipation of a shortage are in some instances running low. This situation is causing a firmness in the market for many lines.

Boiler Tubes Have Again Moved Higher

BOILER TUBES.—An advance of from 5 to 10 per cent. has been made effective in the price of boiler tubes. This follows an upward movement that took place two weeks ago and which amounted to approximately 15 per cent. There has been heavy bookings of boiler tubes in anticipation of higher prices. Dealers are apparently stocking up to provide for their requirements for some little time in the future. Prices on both cold drawn and lapweld boiler tubes have shared in the advance. One-inch cold drawn has been advanced $1 per 100 feet, the new price being $22. Other sizes have made a proportionate advance. Following is the new list of prices:—

	Per 100 Feet	
	Cold Drawn	Lapweld
1-inch	$22.00	.....
1¼-inch	25.00	.....
1½-inch	29.00	$24.00
1¾-inch	30.00	22.50
2-inch	33.00	21.50
2¼-inch	33.00	.....
2½-inch	36.00	29.50
3-inch	47.00	34.50
3¼-inch	.....	41.00
3½-inch	53.00	44.00
4-inch	65.00	55.00

Big Advances in Lead Sheets, Pipe and Solder

LEAD AND ZINC PRODUCTS.—Lead pipe and lead waste pipe advanced 1c per pound during the week, lead wool increased 1c, lead sheets have gone up 1¼c to 1½c per pound and solders of all brands have advanced 4c to 5c per pound. There is a firm market in the lead and tin markets with higher prices and this has sent the prices of their products skyrocketing also. Quotations are as follows:—

Lead pipe, lb.	$0 14	....
Lead waste pipe, lb.	0 15	....
Lead traps and bends	Net list	....
Lead wool, lb.	0 13	....
Lead sheets, 3 lbs. sq. ft.	0 13¾	....
Lead sheets, 3½ lbs. sq. ft.	0 13¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 13¼	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 34	....
Solder, strictly, lb.	0 32¼	....
Solder, commercial, lb.	0 31¾	....
Solder, wiping, lb.	0 31½	0 32
Solder, wire, lb.	0 35	....
Zinc sheets, per lb.	0 25	....

Asbestos Goods Firm; Higher Prices Anticipated

PACKING, MILLBOARD, GASKETS.—Demand for asbestos packing has been very good. Prices on this market are firm and dealers anticipate that there will be still higher prices. There is a shortage of raw materials owing to the commandeering of supplies by the British Government. The situation for asbestos millboard is a precarious one. Some of the manufacturers are not quoting at the present time. They are out of stock and are unable to say whether they will be able to replace it. Goods have been ordered, but the railway situation is coming more and more to be an unknown factor. Corrugated asbestos paper is also in the same position. Boiler covering is accordingly in firm market. Boiler gaskets are in greater demand at the present time than the manufacturers are able to meet. Prices are firm at $1.75 per pound and higher levels would not come as a surprise.

Stillson and Trimo Wrenches Up 10%

WRENCHES.—An advance of approximately 10 per cent. has been made in the price of Stillson and Trimo wrenches. Coes wrenches remain unchanged. Agricultural wrenches also remain unchanged. This advance follows an intimation recently that there was strong probability of such a movement in the market.

Discounts on Pumps Have Been Changed

PUMPS.—By a change in discounts on brass lined cylinders and brass body cylinders for pumps an increased price has been made effective in these lines. Brass lined cylinders are now quoted at 25 per cent. discount off list, as compared with 30 per cent. formerly. Brass body cylinders are now quoted at a discount of 20 per cent., the former discounts being 25 per cent. The discount on pumps remains at 35 per cent. On cistern pumps the discount is 30 per cent. on some and 35 per cent. on others, according to the style.

Quotations on Old, Heavy Copper Higher

OLD MATERIALS.—Old heavy copper is quoted ¼c to ¾c per pound higher during the week, at 24c to 24½c.

There is uncertainty in the old materials market awaiting the developments with respect to the entry of the United States into the war. Demand for these materials has been fairly active during the week. With the one exception noted prices are the same as those quoted last week:—

	Per lb.	
Tea lead	$ 0 06	.....
Heavy lead pipe	0 08	.....
Yellow brass	0 15¾	.....
Red brass	0 19½	.....
Light brass	0 10½	.....
Heavy zinc	0 08	.....
Heavy copper	0 24	0 24½
Old cast iron, per ton	15 50	$16 00
Stove plate, per ton	11 75	.....
Old rubbers, boots & shoes	0 08¾	.....
Overshoes, lumbermen's rubber boots	0 06½	.....
Auto tires	0 05½	.....
Bicycle tires	0 02½	.....

Corrugated Sheets and Galvanized Shingles Firm

SHEETS, PLATES.—There is a firmness in the market for corrugated sheets and galvanized shingles. To some dealers the condition seems to point to higher prices. Galvanized sheets are also in very firm market. Some of the dealers are cleaned out of sheets, but expect to get supplies in the near future. High prices for the galvanized sheets are operating to curtail consumption; in many instances black sheets are being used with a coat of paint to take their place.

Short Coke Supplies Curtailing Pig-Iron

PIG IRON.—Canadian foundry iron is still off the market, and there is no prospect of supplies being obtainable until there is sufficient coke available for the furnaces to operate. Coke is still a very scarce commodity, notwithstanding efforts made by the railway companies to relieve the situation. A considerable tonnage of pig iron is being imported from the States. The situation in this commodity has a close bearing on the price of iron pipe and cast iron enamelware.

Oakum Market Firm; Plumbers Had Stocks

OAKUM.—There is a firm market for oakum in all grades owing to the difficulty in getting supplies. Demand has not heen heavy within recent weeks owing to the fact that most plumbing concerns had anticipated their needs some time previously. Until these stocks are depleted there will not be a noticeably increased demand. In some quarters there is anticipation that higher prices will become effective before relief comes. There have been no price changes since last issue and prices quoted are as follows:—

	Per Lb.	
Plumbers' spun	$ 0.08	$ 0.08½
Best American	20.75	21.00
U.S. Navy (American)	20.00	20.35
Clipper U.S.	28.00	.....
U.S. Navy (English)	16.50	.....

Trade in Valves and Boiler Fittings Good

VALVES.—There has been a particularly heavy demand for valves and steamfittings of all kinds. This demand in some instances is keeping manufacturers running to capacity at their plants. This class of article is going largely into munition plants and industries of other kinds. The demand for boiler fittings has also been good. Prices for valves have remained stationary during the week, the discounts being quoted as follows:—

	Per Cent.
Ground work	45-47
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2,	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	20
Globe, angle and check valves, standard	25
High grade	20
Radiator valves, standard	30
High grade	30
Patent quick opening valves	60
Basin Cocks—	
No. 0 & 1, Fuller pattern	53
No. 0 & 1, compression	49
Midget	51
Steam cocks, square nut	50
Steam cocks, iron body	45
Globe, angle and check valves, medium pressure	40
Radiator valves, standard	60
Radiator valves, Jenkins disc	60
Radiator valves, quick opening	60

Conductor Pipe Orders For Spring Are Good

CONDUCTOR PIPE.—Dealers in conductor pipe have been placing partly heavy orders for conductor pipe in anticipation of their needs for the coming year. Consumptive demand at the present time is not heavy. There is some necessary demand for repair work. Deliveries may be somewhat retarded this year owing to the situation in the raw material markets. Prices for conductor pipe, eavetrough and elbows held steady during the week and are still being quoted at 35 per cent. off list. Following are the list prices:—

PLAIN CONDUCTOR PIPE.

2 in., in 10-foot lengths	$ 8.00
3 inch	9.70
4 inch	12.80
5 inch	17.50
6 inch	21.30

O. G. EAVETROUGH.

8 inch	$ 6.90
10 inch	7.70
12 inch	9.10
15 inch	12.50

EAVETROUGH CONDUCTOR ELBOWS.

2 inch	$ 1.90
3 inch	2.20
4 inch	3.60
5 inch	9.00
6 inch	10.50

Above lists subject to 35 per cent. discount.

Demand for Enamelware From Smaller Centres

ENAMELWARE, BOILERS. — Reports from the dealers in enamelware and range boilers are to the effect that there is a continued good demand for enamelware, and range boilers, etc., from the smaller centres and country districts. This would seem to indicate that there is more building of residences going forward there than in the larger cities. Prices have held steady during the week. Quotations are as follows:—

30-gallon range boilers, standard	$10.00
30-gallon range boilers, extra heavy	12 50
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	23.70
Bathtubs, 5½ ft.	27.30
Sinks, roll-top, 18 x 30 in., staple	12.15

Soil Pipe Orders Have Been Heavy

SOIL PIPE.—Although the consumptive demand for soil pipe is light at the present time the demand to the manufacturers has been greater than they are able to take care of. This is attributed to the fact that jobbers have been making themselves secure for their supplies in anticipation of higher prices. Manufacturers are finding their operations greatly curtailed at the present time due to the shortages in raw materials. Meagre supplies of coke are causing a serious situation with some manufacturers. Stocks of coke and coal that they provided some time ago are now petering out and in some instances they do not look with calm and unperturbed feelings toward the future. Discounts on soil pipe and fittings remain unchanged. Malleable fittings are quoted at 15 per cent. off list and cast iron fittings at 45 per cent. off list. The market for these articles held steady since last issue.

	Discount
Medium and extra heavy soil pipe, 6-inch and under	55%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	60%
Malleable fittings	15%
Cast iron fittings	45%

U.S. at War Would Affect Wrought Pipe

WROUGHT PIPE.—There is a firmness in the market for wrought pipe, which to some dealers seems to point to higher prices. The American market for raw materials is firmer in the face of the possibility of that country becoming involved in the war. In Canada there has been a good demand for pipe for repair work and on the construction of new munition plants. With the tightening of condition in the United States there has been a sympathetic movement of price conditions in Canada. With the United States in the war as an active participant there would



GOSSIP OF THE TRADE

NEW LEAD SMELTERS

The Kingston Smelting Co. will shortly be running to capacity. The lead that will be smelted in this plant is to be obtained from British Columbia, the United States, and also from mines in this district. At the present time there is an embargo on crude lead from the United States, but the management hopes to have this removed.

FIRE LOSS

Messrs. Anderson & Company, sanitary and heating engineers, Donald St., Fort William, suffered a fire loss recently, the cause of the fire appears to be somewhat of a mystery. Shortly before the outbreak was reported, Mr. Anderson and a couple of friends were on the premises. A loud explosion occurred, startling the neighborhood, the glass in the front of the building being blown across the street against the telephone station, and the operators on duty sent in the alarm. Insurance is carried on the building and contents, but at present the amount is not known.

PASSED ON

Mr. Andrew C. Milsom died recently at the Toronto General Hospital in his fifty-first year. Ten years ago he came from Bristol, England, and engaged in the plumbing and steamfitting business at 1233 College Street. He was secretary of the Hearts of Oak Medical Agency, and to many an Old Countryman in times of sickness and need proved a friend. He founded the medical agency here in connection with the Hearts of Oak Fraternal Association. The late Mr. Milsom was operated on for appendicitis, but failed to rally. He is survived by his wife, one son, Fred, and a daughter, Miss Doris. He was a member of the Anglican Church and of the Sons of England.

NO PERMITS PROCURED

Why permits? Why should I go down to the City Hall and ask that I be permitted to do a certain repair job?

Such must be the thoughts which come to the minds of many a sanitary engineer when called in to execute certain work in the nature of a repair, alteration, or re-construction.

But why do these thoughts enter one's mind? Simply because the reason for the permit has not been studied out.

A permit is more than a document authorizing a person to do certain work. It is also a recognition from those who know how such work should be done, that the party wishing to have work executed is going to be safeguarded on the one hand, and that some responsible person is being authorized to do that work. At some very early date we will show our readers how irresponsible persons are in these days doing work. We shall also show why the health departments have to create conditions and bring laws into being that will not only prevent impractical men from attempting work they cannot do, but also safeguards the health and property of the public.

Just recently, two persons in Toronto were fined $10 each for altering certain portions of plumbing systems, both pleading ignorance of the law. It is a good thing for all concerned that such a plea cannot be accepted these days.

REGARDING PENSIONS

The Dominion Government have appointed a Board of Pension Commissioners for Canada with offices in Ottawa. As this Board wish to cause as little delay as possible in dealing with communications with regard to pensions, they wish the public to correspond directly with the Board of Pension Commissioners, Ottawa.

A great deal of delay may be caused by communications being sent through other departments of the Government.

The Patriotic Fund Association and the Military Hospitals Commission have kindly consented to give information and assistance to those wishing to write direct to the Board of Pension Commissioners. These societies have offices in certain localities throughout Canada.

In addition, in order to facilitate the granting of pensions, the Board is opening branch pension offices in Vancouver, Calgary, Edmonton, Regina, Winnipeg, London, Hamilton, Toronto, Barrie, Kingston, Ottawa, Montreal, Quebec, St. John and Halifax. All information with regard to pensions may be obtained from these offices.

WAR AND DISEASE

Addressing the Canadian Club recently, Dr. Hastings, the medical officer of health, drew a comparison between the deaths caused by war and those from communicable diseases. In the first two and a quarter years of the war, deaths at the front from all causes were 15,766. Those from communicable diseases in Canada were 22,560 for the same period, 6,794 more.

"As sensible men, what are we doing to prevent this preventable loss of life?" asked the doctor.

Health was not a matter for the individual; it was his public duty to keep well. From a monetary point of view, too, the preservation of the public health was a good business. Sir Thomas Oliver had estimated that the monetary loss in industry through illness in the United States was equal to $772,892,860 annually.

It had been shown in schools by repeated experiments that the efficiency of teachers and scholars was reduced by as high as 20 per cent. by bad ventilation. Was it not a business matter for the manufacturer to consider whether or not his working force was being reduced by ten or fifteen per cent. by a bad system of ventilation and poor sanitary appliances?

The doctor described as foolish the man who would think of omitting to take his automobile engine to be overhauled by a specialist, but never thought of taking his physical machine to the doctor to be overhauled to ward off ailments. There was much work to be done also in the prevention of venereal disease through education now prevented by false modesty.

F. E. MYERS BROS.' CATALOGUE

F. E. Myers & Bro., Ashland, Ohio, have issued their 1917 calendar. The calendar is somewhat similar to the one issued in 1916, and shows illustrations of many of the products made by the company.

Secure Control of Galt Brass Co.

Robert J. and William J. Cluff, of Toronto, Buy a Controlling Interest in Galt Company—No Changes to be Made in Operation of the Concern — New Link Added in Extensive Manufacturing Chain.

A controlling interest in the Galt Brass Co., Galt, Ontario, has been secured by two prominent Toronto manufacturers, R. J. Cluff and W. J. Cluff. The change constitutes the most interesting development in the industrial field for some time.

The widening of scope in the operations and activities of the two Cluff brothers has been so rapid of late as to make a story that reads almost like a romance. They have carried on their business as plumbing jobbers under the title of Cluff Bros., and as manufacturers of "Vitro" tanks under the firm name of Cluff Mfg. Co., most successfully for years. Since the start of the war they have organized Cluff Munitions Limited and, it is understood, have been most successful in this line. Their most spectacular effort was the organization of a company this summer to take over the plant and business of the standard Ideal Co. The Port Hope Sanitary Manufacturing Co. was formed with R. J. Cluff as vice-president and W. J. Cluff as one of the directors. It is safe to assert now that the new company is meeting with an unusual degree of success and that the extensive business at one time controlled by the Standard Ideal Co., is being won back.

The latest step of the ambitious brothers is, in every sense, a logical one. They have needed control of a brass manufacturing plant to round out their interests in the plumbing line. Their manufacturing activities now cover enamelware, tanks and, through the Galt plant, brass goods.

No Change Contemplated

THE SANITARY ENGINEER learns that no change is contemplated in regard to the Galt Brass Co. It will continue running under that name and no changes will be made in the personnel of the management. John McLaren will continue at the head of the concern.

It is understood, however, that the lines manufactured will in time be added to. It is planned to turn out new specialties and to increase the plant as circumstances warrant. It is definitely stated that, when the war is over, steps will be taken to double the plant in size. There is no intention of moving the plant from Galt.

History of the Company

The Galt Brass Co., was organized eight years ago. John McLaren, who had formerly been connected with the



ROBERT J. CLUFF.

Canadian Brass Co., became president and general manager of the concern. Despite the fact that the last five years have been marked first by business depression and then by the uncertainty of war conditions, the Galt Brass Co. have been successful in building up a



WILLIAM J. CLUFF.

wide connection and in establishing an enviable reputation.

To revert back to the story of the business careers of Robert G. and Wm. J. Cluff, it is interesting to note that their rise to prominence in manufacturing circles has been a matter of recent years only. They are still young men. The developments of the past year, however, have put them in the forefront. Few manufacturers have more extensive and diversified interests. The last step, by which they have gained a controlling interest in the Galt Brass Co., is a personal venture on their part. None of the other companies with which they are connected is concerned in any way in the deal.

IN—EFFICIENCY

Ring—r—r——g——

"Say, Mr. Editor, I'm in an awful fix, can't get a plumber for love or money; tap at the basin is on the blink. Can you help me out? Wish you only lived a bit nearer, so that you could **give** me a little advice once in a while."

Say, reader, just listen to the "plaintive wail."

"What shall I do, Mr. Editor?"

"Well, what kind of a tap is it?"

"Oh, you just turn it back and it opens, or you turn it back again and it opens. I might say, I took it apart and found some kind of a thing with a twist on it, but there's no washer that I can see."

Assuming that it was a Fuller tap and knowing full well that the brass goods in this house were about as cheap as they could be, paid for in **love**, not money, and therefore **lovely** quality, I replied: "Well, sir, get a **sanitary engineer** to put you a new one on," and mentioning several high grade lines, I rung off.

Next day, however, I met the fellow of tap trouble, and out of his pocket comes the spindle and handle of a Fuller tap with the eccentric piece broken off. I still advised a new tap, but said he might get repairs at so-and-so's shop.

Only having above piece named, off his lordship goes on a hunt for the piece. only to find that not having the body, or the broken off end of the eccentric, he got the wrong piece. "Well, well," says I to myself, "here is a man who, if he is not earning $5,000 a year ought to be, going hunting all over the city of Toronto for repair pieces to fix his own tap. Where, oh, where art thou, goddess of efficiency? Where will this 'fix your own plumbing bug end'?"

Here was a house worth in the neighborhood of $8,000 or more, inhabited by a respectable, well meaning family, yet lacking hot water for at least two days all for the sake of a few dollars.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHY BOOSTERS OR GENERATORS?

Editor THE SANITARY ENGINEER.

I am well aware that heat generators, as they are called, appear to make the water hotter, but I would like to know why they do so—that is, how can a higher temperature be created than steam, the point of evaporation of water at 212 degrees? How is it that some makers claim that by installing their heat generators a higher temperature can be, and, in fact, is procured, and no steam be raised? You may have taken this matter up before, but I have not been a subscriber very long, and would like to get your answer to these questions, as I intend going after some business improving sluggish hot water systems.

Hot Water Fitter, Manitoba.

In answering the above question, it would be well to first explain that there is an actual pressure of 14.7 lbs. per square inch on an open system—that is, a hot water system, that is merely fed from an expansion tank placed at a point higher than the highest radiator, and this is the reason why water boils at as high a temperature as 212 degrees.

If a vacuum were created—that is, the atmospheric pressure taken off the water, then the water would boil, and steam would be created at as low as 98 degrees Fahr. Now, suppose we start with a vacuum which really means no atmospheric or, say, one inch of vacuum, the water would boil at 210; two inches of vacuum would cause the water to boil at 208, and so on until a complete vacuum be created, which would lower the boiling point to 98 degrees Fahr.

This would be reducing the absolute pressure from the water, and just in this way would also reduce the temperature of the water at boiling point, so that adding weight to the outlet or open end of a hot water system would cause a higher pressure than atmospheric and, consequently, a higher temperature of water, and, therefore, a higher degree boiling point.

We spoke of an absolute pressure and an atmospheric pressure; it would not be out of place here to define these terms and the difference between them. Atmospheric pressure is 14.7 lbs., or what is more commonly termed 15 lbs., an absolute pressure would be any gauge pressure plus 15 lbs.; for instance, gauge pressure registers 10 lbs., whether steam or water, it would be 10 lbs. plus 15 equals 25 lbs. absolute pressure, and if a hot water system was fitted up with an altitude gauge and a thermometer, side by side, and, say, the altitude gauge registered a pressure of 8 lbs., it would be found that a temperature of something near 235 degrees Fahr. against an open system at a little over 212.

These arguments prove that under any condition a heat generator that exerts a pressure upon a hot water system, and at the same time provides for the unobstructed contraction of the water, cannot help but cause the system to give off not less than 5 per cent. more heat, and most heat generators or boosters are so designed as to exert a pressure of 15 lbs. on the system, thus increasing the temperature even more than 235 degrees.—Editor.

WHY FOOT VALVES?

Editor THE SANITARY ENGINEER.

I have noted several times in THE SANITARY ENGINEER that a foot valve was always necessary at end of a suction pipe; and in your last issue you refer to the subject in answer to a question as to whether a foot valve is needed, etc. I have put in quite a number of pumps in kitchens in my time, and never put a foot valve on except when the well was over twenty feet deep. It may be the people have not had as good pump service as they would have had if I had used a foot valve.

I would like to know why the foot valve is advocated, and how it will improve a pumping outfit. I am a firm believer in making all the improvements I can on a job. P. P. S., Sask.

It is questionable whether there is a more interesting subject than that of the use of a foot valve.

The writer paid a visit to a country town some months ago in connection with a complaint which had been made about the failure of a pneumatic system. It was found that, in spite of the fact that the system was installed in a splendid manner, the suction line was over 50 feet long, 38 feet of which was horizontal and about 12 or 14 feet of a vertical drop into the well; there was no foot valve at the foot of the suction line, and the complaint was that it took nearly ten minutes' working before water came. It was also claimed that a larger amount of air collected in the tank than was wanted.

Now, what did this condition prove? First, that having no foot valve on the suction line, the pump had to operate a few minutes before the pipe had got all the air pumped out of it, and that those few minutes were being used in that way before the water could be drawn into the cylinder of the pump. Further, during the period of pumping, the air being elastic, would alternate in each direction with the alternating stroke of the pump, at least some of the air, while some portion of the air was being forced into the pneumatic tank, which by the way spoke very highly of the pump. Next, if a foot valve had been placed at the foot of the suction line, a column of water would be held in the suction line on the top of the foot valve. The piston at the pump would always be in contact with the water and the first movement pump would as it were immerse into water, the valve on the pump holding that column of water until another

(Continued on page 30.)

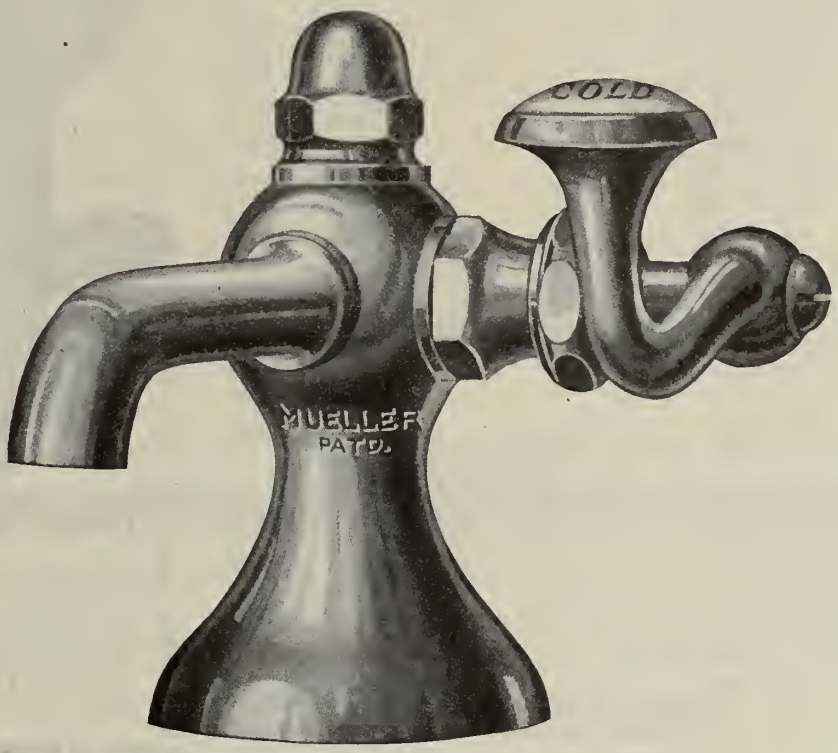
MUELLER

Self-Closing Basin Cock

SIDE LEVER INDEX HANDLE

Patent No. 159487

December 15, 1914



D.—11950

A REAL ARISTOCRAT

of symmetrical design and proportion.
Opens with the most natural action.
Made regularly with flat spout 3½ inches from centre of cock body to centre of spout opening; furnished 2¾ inches centre to centre to specification only.

MANUFACTURED ONLY BY

H. Mueller Mfg. Company, Limited

SARNIA, ONTARIO

Makers of Fully Warranted Water, Plumbing and Gas Brass Goods.

WHY FOOT VALVES?

(Continued from page 28.)

charge would be forced through, and in that way force the water into the tank, or to any point reasonably beyond the outlet of the pump.

On the other hand, if a foot valve be omitted, the result is as follows:—First, in some kinds of pumps the suction line is full of air, the pump is primed, or the leathers are moistened; in others it is the piston packing that has to be moistened. Operating the pump draws the air out, which takes time; the water is practically free to flow back into the well or cistern, and is bound to alternate a certain amount, so that the pump is under a far greater strain than it would be if the foot valve were connected, simply because of the fact that at each movement or stroke of the pump water would be displaced, which is incompressible, instead of being free to return to its source unobstructed.

What is more common to see in a farm kitchen than the person requiring water going to the cistern or fresh water pump and pumping for several minutes before water comes? This is because of there either being no foot valve on, or else only one of very poor quality, or something has got in between the clack in the valve of the seat.

It just means this, that every pump should be fitted up with a foot valve if the pump is to give maximum service, and if every stroke of the pump has to count service.

In the course now appearing in THE SANITARY ENGINEER this very subject will be taken up more fully, and will be illustrated with practical diagrams.—Editor.

PRACTICAL SHEET METAL WORKERS

(Continued from page 19.)

Now draw lines upwards from 1, 2, 3, in line with the stretchout shown in Fig. 3 from the various intersections on joint L M N in the elevation Fig. 1, until all the stretchout lines have been crossed in Fig. 3.

Now draw the curved lines from N to M. M to F. F to M and M to N. Crossing each point already crossed as shown at 1,2,3,4,5,6,7, etc. The outline M F M. N N O O is the pattern for the branch piece required.

An allowance must be made for seams and joints, these to be determined by the person making the pipe. If a riveted joint, only one width of caps would be necessary, but if a locked seam is required it would be necessary to allow three times the width of the lock.

MARKET CONDITIONS

(Continued from page 25.)

be a still greater shortage of supplies. Volume of business is perhaps not greater than at this time last year, but the firmness in the market for raw materials has created a different situation and made it more difficult for manufacturers to get their goods into the hands of dealers. Prices have held steady during the week.

	Per 100 ft. Blk.	Glvd.
Buttweld		
⅛ in.	$ 4.25	$ 5.75
¼ in.	3.54	5.67
⅜ in.	3.54	5.67
½ in.	4.59	6.16
¾ in.	5.64	7.76
1 in.	8.33	11.48
1¼ in.	11.27	15.53
1½ in.	13.48	18.56
2 in.	18.13	24.98
2½ in.	28.67	39.49
3 in.	37.49	51.64
3½ in.	46.92	63.94
4 in.	55.59	75.76
Lapweld—		
2 in.	21.09	27.57
2½ in.	31.59	41.83
3 in.	41.31	54.70
3½ in.	51.52	68.54
4 in.	61.04	81.21
4½ in.	71.12	94.62
5 in.	82.88	110.30
6 in.	107.50	143.00
7 in.	142.80	186.80
8 in. L.	150.00	196.30
8 in.	172.80	226.10
9 in.	207.00	270.80
10 in. L.	192.00	251.20
10 in.	247.20	323.40

Ingot Metals Firm And Advancing

Ingot metals are all firmer in price, with advances recorded in several instances. The future is very uncertain. Stocks of all metals are very light.

LEAD.—The lead market is very firm and lead prices are now at the highest levels that have prevailed since the outbreak of the war. Quotations at New York are purely nominal. Local prices range from 10¾c in large shipments to 11c for small lots.

COPPER.—For the first time in 34 years the American metal market on Monday of this week did not quote a price on copper. Efforts are being made to have a Government census taken. Locally the price is 37c lb.

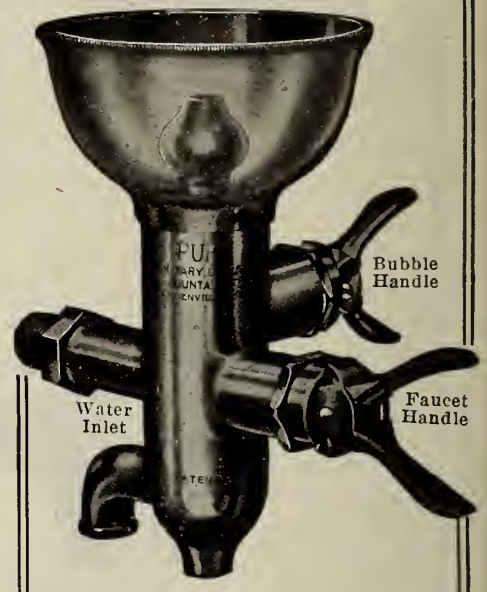
ANTIMONY.—The antimony situation is attracting considerable attention, and very little spot antimony is offered. Prices are double those asked a month ago, and locally the price ranges from 35c in large lots to 38c for small lots.

TIN.—Tin like all other metals is higher and the market is very uncertain. Price locally is 57½c lb. with concessions to large buyers.

SPELTER.—Quotations on spelter are unchanged from last week. Stocks are very light and prices range from 13½c to 15c lb.

ALUMINUM.—Prices on aluminum are unchanged, at 68c lb.

PURO
(MADE IN CANADA)
Saves Dollars
Why let that old-fashioned faucet go on year after year wasting water—MONEY? Why more drinking cups and glasses, only to become unsanitary—lost, broken or carried away? Puro Sanitary Drinking Fountain stops all this needless waste. Puro saves you 35% on the water bill alone. Puro saves you all that money you spend for cups. YET Puro is always ready with a clear, cool drink with dollars in the bank.



Puro Pays for Itself
You don't have to wait years to get back the small investment you have tied up in Puro equipment—
You start cashing in at once—not only on your water bill saving, but on the increased efficiency of your workers as well.
Men like PURO—it's clean. No danger of deadly germs lurking in its sparkling bubble.
Write us—tell how many men, how many departments, and we'll tell you how much the cost will be to

"PURO-FY"
YOUR WATER SUPPLY
Puro Sanitary Drinking Fountain Company
147 University Ave., Toronto, Canada

WANTED
By firm of boiler and radiator manufacturers a representative for eastern Ontario and Ottawa, to call on plumbers and steamfitters. Splendid position to right man who understands the heating trade. Box 309, Sanitary Engineer.

Kindly mention this paper when writing advertiser

J.M.T.

You can put a stop to faulty hot water systems by installing

The Knickerbocker Generator

It is a positive remedy that is easily applied to the open or closed systems of hot water heating. Entirely automatic.

Connects with one-inch nipple to outlet of expansion tank.

Makes a hot water system equivalent to a low pressure steam plant.

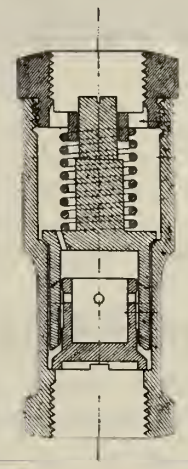
Increases radiation from 25 to 30% with same firing.

Reduces the size of pipes and fittings.

Temperature of water can be varied up to 250 degrees.

A top-notch profit producer.

Particulars on request.



SECTION

THE JAMES MORRISON BRASS MFG. CO., LIMITED

93-97 Adelaide St. West, Toronto

J.M.T.

Our Mixed Metal Sales Amount to Over $5,000,000 Annually

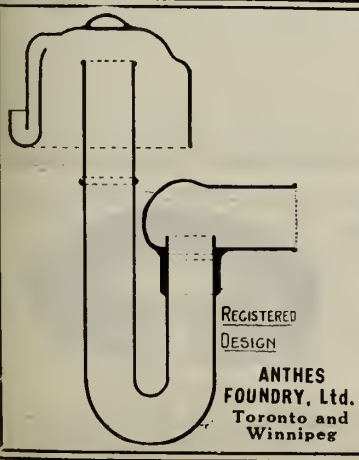


HOYT'S WIPING SOLDER is as perfect as experience and first class ingredients can make it. As only one perfect Wiping Solder can be made we manufacture only one grade, which must necessarily be Hoyt's high standard of quality.

Special attention is called to our Bar Solders, Wire Solders. Lead Pipe, Waste, Traps and Bends. Your orders will have prompt and careful attention. not sometimes—but all the time.

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y.; London, Eng.; St. Louis, Mo.



IF IT'S SYPHONS, ASK US

And look at this one. Note the long caulking length.

Ask us about our inside vented syphon. It's a dandy. Saves making many joints.

We unconditionally guarantee every syphon to operate automatically. And it has no moving parts.

Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

"THE KING"
OF THEM ALL

Note the thin waterways and wide heatways. Just look at the deep fire-pot. Every pound of coal is given a chance to transmit heat to the radiators.

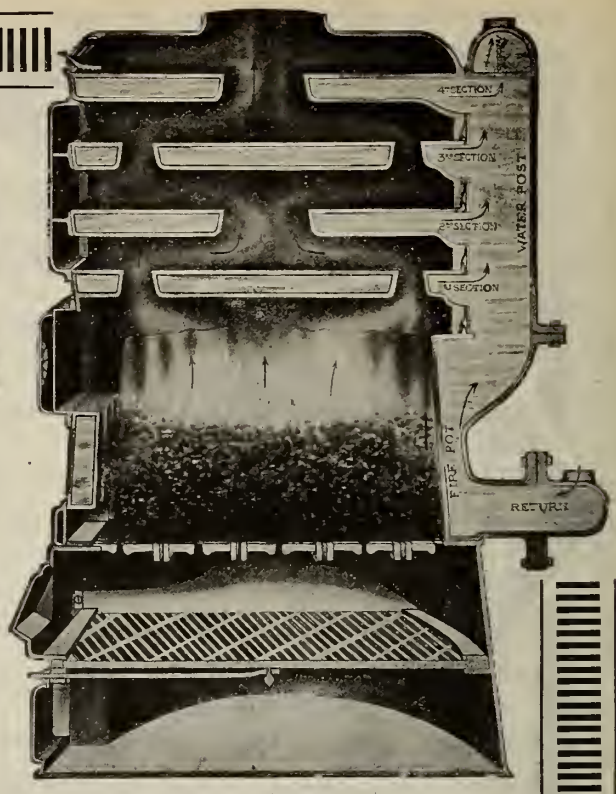
These are the outstanding features which make King Boilers the most effective heating appliance on the market.

STEEL and RADIATION, Limited

Head Office: FRASER AVENUE, TORONTO

304 University Street, MONTREAL **101 St. John Street, QUEBEC**

AGENCIES IN ALL LEADING CITIES



Sectional View "King" Boiler, High Base

LOOK AT THE WATERWAYS

ALPHABETICAL LIST OF ADVERTISERS

Occasionally advertisements are inserted in the paper after the index has been printed. The insertion of the Advertiser's name in this index is not part of the advertising order. The index is inserted solely for the convenience of the readers of the paper.

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No. 7 Iron
3-8 in. to 3 in.

The "B. & C." Combination Floor and Ceiling Plates

The standard for years, and carried by the leading supply houses.

Insist on "B. & C." Plates.

Manufactured exclusively by **The Beaton & Corbin Mfg. Co.,** The Old Original Company Southington, Conn.

Send for catalogue of complete line.

Canadian Representative:
W. H. Cunningham, 98 Kingswood Rd., Toronto, Canada



No. 10 Steel
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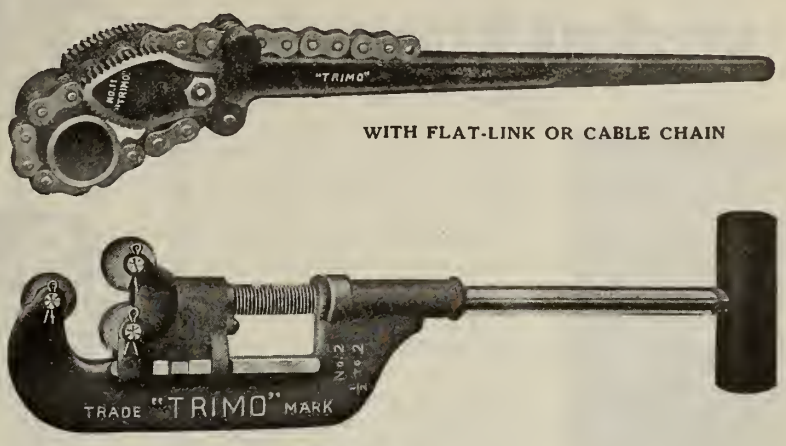
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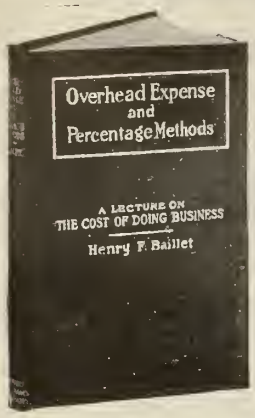
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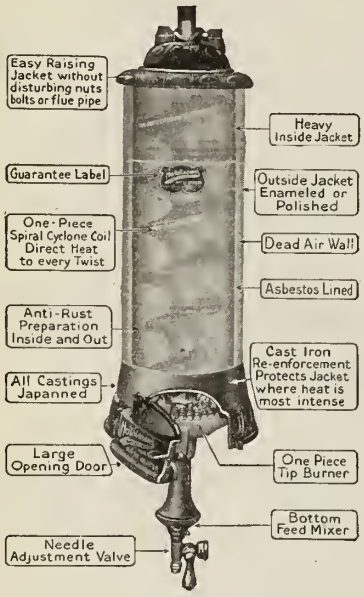
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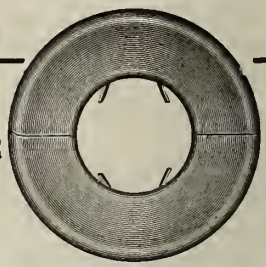
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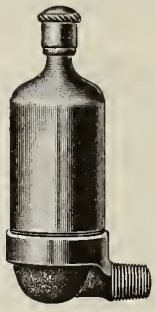


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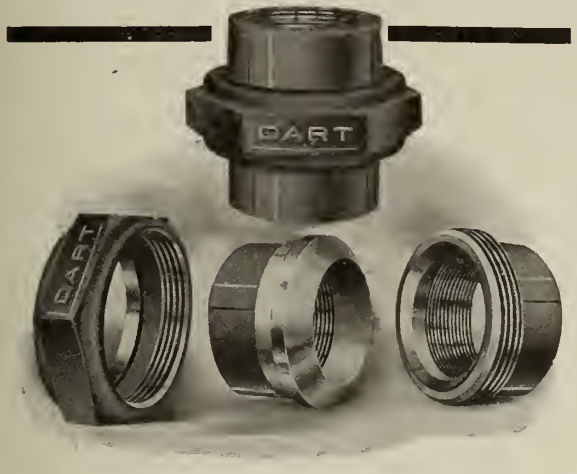
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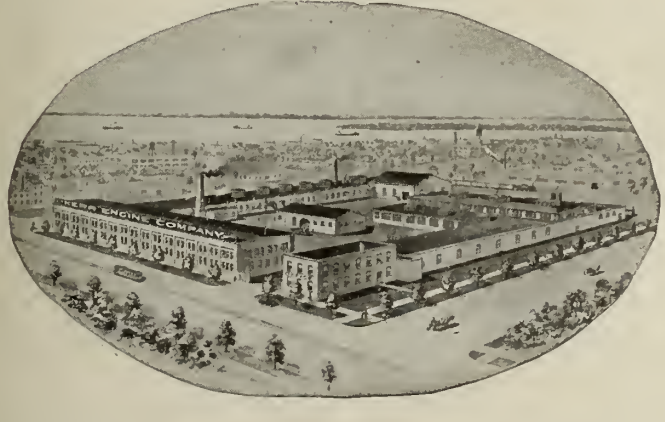
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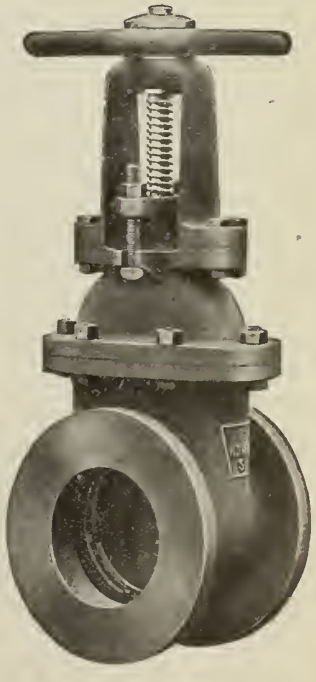
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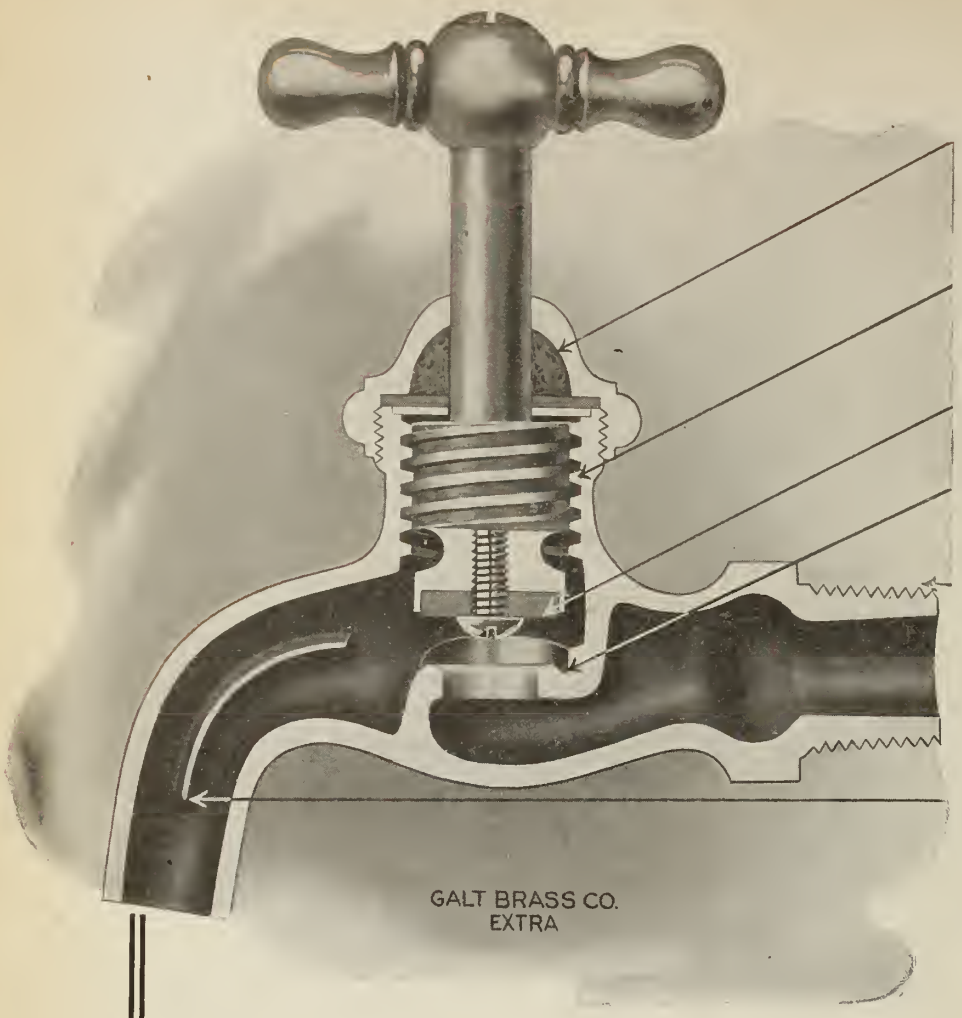
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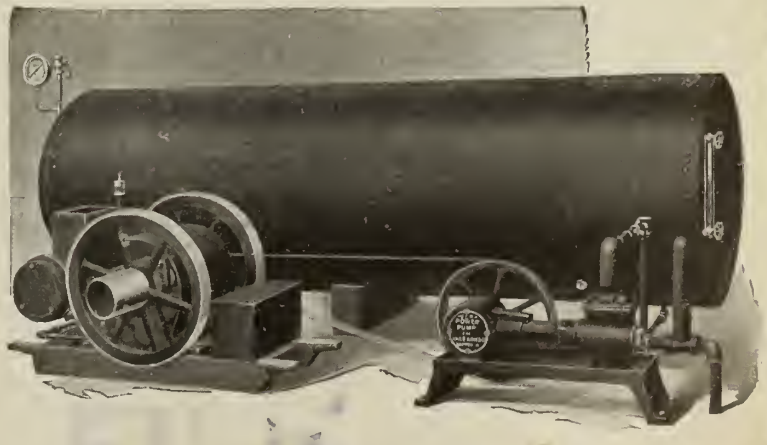
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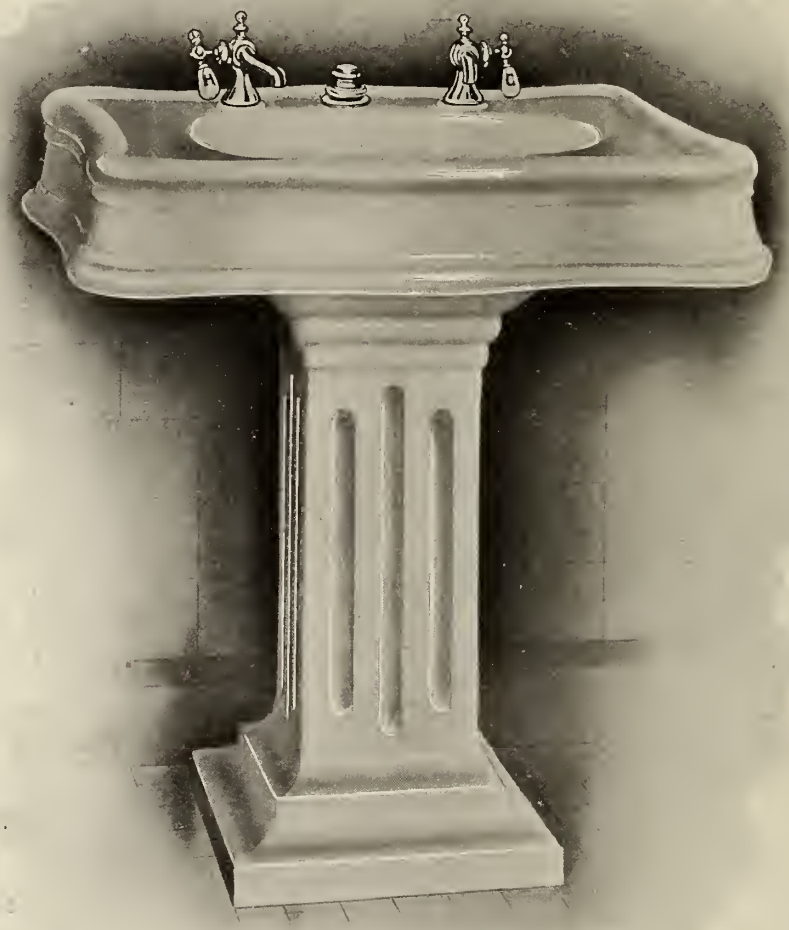


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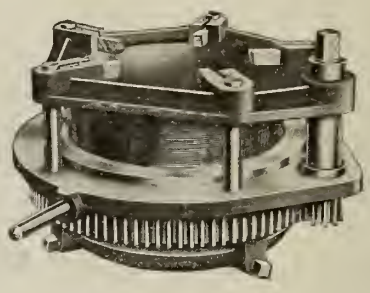
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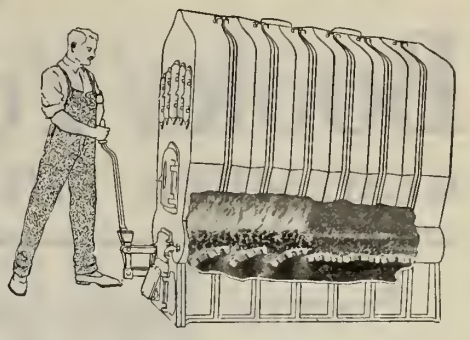
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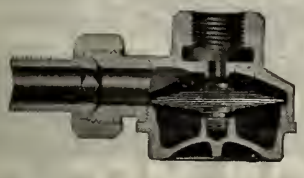
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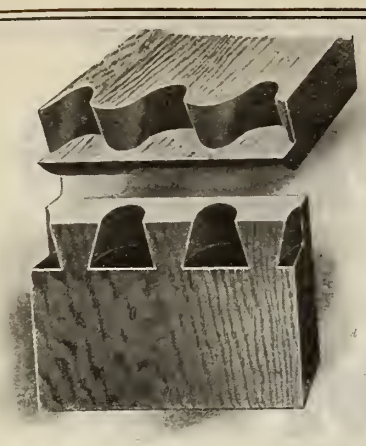
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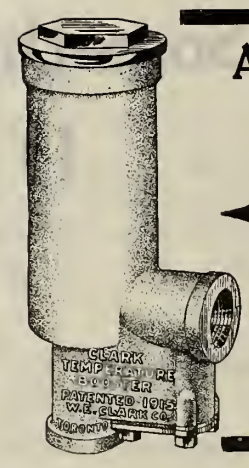
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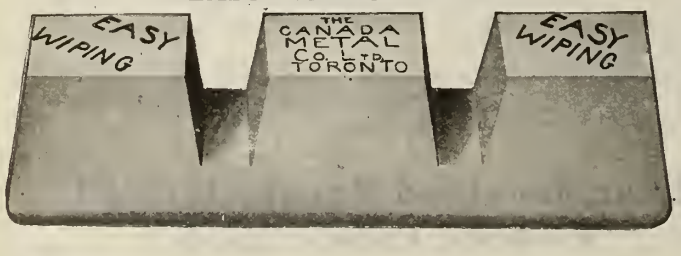
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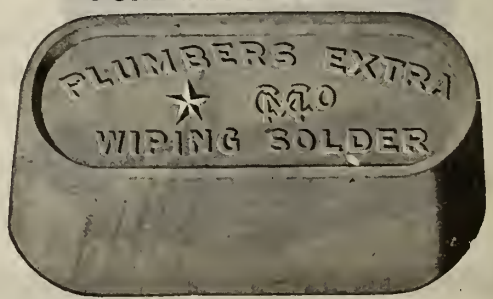
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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

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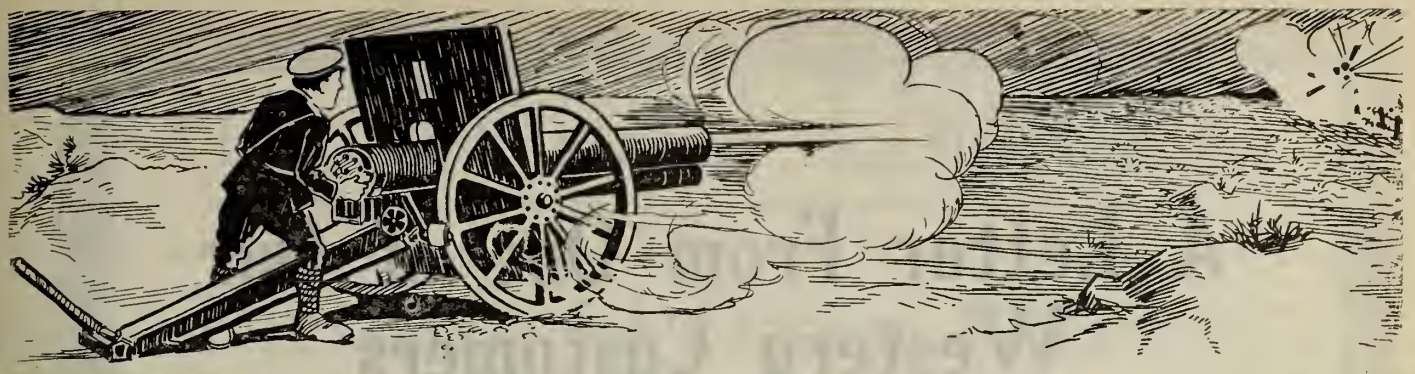
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THE SANITARY ENGINEER

VOL. XI MARCH 1, 1917 No. 5

The Cost of Doing Business

Nothing Mysterious About the Subject—Only Requires a Little Thought — More Co-operation Between Employer and Employee Would Result in Mutual Benefits to All—Good Practice to Find Out Each Day's Cost of Doing Business.

BY ONE OF US.

IT has been stated many a time that the cash rating of sanitary and heating engineers as a whole does not prove that they are a wealthy class, nor are they as comfortably off as is the case with most men engaged in other lines of business.

Some there are that have earned a comfortable competency, but they are the exception instead of the rule. Yet it is doubtful if there is one class of men who serve the public to a greater extent than do sanitary and heating engineers; the nature of their work is such that it is absolutely necessary to the general welfare.

Now what is the reason for this state of affairs? Why is it that in spite of the fact that sanitary and heating engineers are always more or less in demand for needful work we do not as a whole appear to be able to put a little away for a rainy day?

The cost of doing business is the answer. It costs the average man too much to conduct his business. It costs him his own time, sometimes the time of his sons and daughters. Sometimes his wife helps with the books, but he makes only a nominal charge, which really means that their time, or at any rate a part of it, is being given over to his customers for only partial payment. One man says: "Well, you see I own the property and have only my taxes to pay." Another says: "I don't have any cartage accounts, because the jobber delivers my goods on the job." And another emphatically declared that he had no bad debts, "because I allow a discount for prompt payment, and in that way encourage quick settlements." It might be well to state that not one of these have ratings over $2,000. All three have been in business over ten years, which proves that as business men they have worked for ten years, and in business circles are looked upon as not being worth more than $2,000 each, less than $200 a year after paying all expenses. But there are worse cases than these by far; cases where hundreds are merely eking out a living. Why? Because it is costing them more to conduct a business than it should, and they are not aware of it.

The one who owns the property is practically loaning it to his customers for nothing. He might just as well put the value of his property into the bank, take out the taxes and give the balance of the interest to strangers, the first that he meets on the street.

The one who says he has no cartage charges is laboring under a delusion. His supply house must charge on the goods the cost incurred for delivery. Cost there is, and it must be paid in some way, and the only source from which such expense can be recovered is from the goods that are delivered.

The person who thinks he does not incur collection expenses because he adds on sufficient to the invoice to cover a liberal reduction is living in a fool's paradise, and is deceiving no one more than himself. The class of customer who expects a liberal rebate must know that the amount deducted was provided for in the original charge. Further than that, there is the danger of adding a certain per cent. on, and allowing another per cent. off, or rather a different sum of money off.

This was plainly demonstrated in a recent issue. Before a percentage is added to a principal, that principal is the base upon which the percentage is determined. After the percentage has been added, another figure is constituted principal, and a higher base is created. The table shown on page 23, February 1st issue, gave a few splendid illustrations, and, while a cursory perusal of the table may not be quite convincing, a careful study of it will soon make things clear.

Let us take a few examples and prove the figures quoted. The simplest ones will be the easiest to handle. Let us assume that $50 is the principal, and we add 25 per cent.—viz., 25 cents to every dollar, making a total of $62.50. We have to procure 25 per cent. for our overhead and profit; $62,50 is the sum from which we pay ourselves, and $62.50 is the sum total of our endeavors. It has cost us 25 per cent. to procure that $62.50; therefore, we must take the 25 per cent. out of the $62.50, that is the final proceeds received. Now, 25 per cent. on $62.50 is $15.62½, and our original amount, which is assumed to be cost of material and time, will leave us only $46.87½, a loss of $3.12½, or, in other words, a loss of capital equivalent to that amount.

But, as the table referred to points out, if we want 20 per cent. profit, or 20 per cent. to meet our overhead and profit, which is the proper term, then we must add 25 per cent. to the principal. This is proved by taking only 20 per cent. from $62.50, viz., $12.50, leaving the original sum $50 intact.

The same with the figure 70 per cent. which reads: 70 per cent. added to cost is equal to 41 per cent. profit on selling price. The principal is the same, $50, and we add 70 cents to each dollar, making a total of $85. Again, we must recognize the sum of $85 as the total proceeds, and 70 per cent. is the sum we added, whereas it is 70 per cent. we have to pay out of total receipts. Very well. Let us then proceed to pay 70 per cent. out of $85, and what do we have left? Seventy per cent. of $85 equals $59.50, leaving only $25.50, whereas our cost was originally $50; but, on the other hand, if we take 41 per cent. from $85, we find that we have 15 cents more than $50—a fraction over our original cost.

It is far better to base the overhead and profit on the selling price than on cost, because the true cost includes overhead, and this must be based upon receipts or business actually transacted.

Cost of doing business is just as real as the merchandize bought or sold; and

more so, because the cost of doing business must be paid as time goes on, whereas payment for goods may be deferred. That is why creditors are 90 per cent. of them creditors for the value of merchandise supplied. Rent, taxes, telephone, postage, wages of proprietor, insurance, workman's compensation, labor, replacing defective goods or workmanship, stock-keeper's salary, lost shop time, discounts allowed on cash received, all have to be paid beforehand—that is, **out of the proceeds.**

Therefore, it can be plainly seen that if one adopts the method of figuring profits on cost, he must have predetermined his cost in some way or other, and be satisfied with whatever surplus there is left after the overhead is paid; and if a person were to determine (or shall we say become involved for certain sums apart from his business?) and reckon upon having 15 per cent. profit to cover this indebtedness, only having added 15 per cent., he would find that only 13 per cent. was available.

(Continued in next issue.)

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 10

The New Hampshire Sewage Tanks

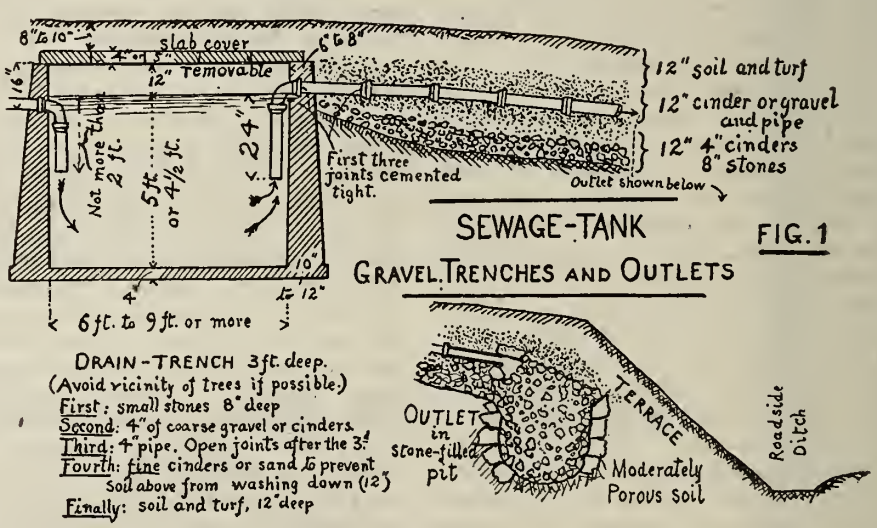
SEWAGE disposal is a matter that cannot be settled by theory only, or by generalisms merely. Past experience has amply demonstrated that fact. And the value of actual experiment is more fully recognized every day. This is in accord with the way all science is now regarded. Actual experiment and observation have taken the place of the so-called "authority" of older days.

For some years, some few experimental stations have been in operation on this continent for the express purpose of determining the best method of sewage disposal under varying conditions. When the City of Philadelphia wished recently to put in a new suburban plant, experiments were actually carried out under local conditions, and what seemed to be the most satisfactory method was adopted. Recently a number of cities have been carrying on experiments with the new activated sludge process. In Canada, The City of Regina has been active in this respect, but the City of Milwaukee, U.S.A., has no doubt carried out the trials in the most complete manner. THE SANITARY ENGINEER has placed itself on record some few issues ago as protesting against, say, a city like Toronto awaiting the results of experiments carried out elsewhere. Sewage disposal data or information should be readily available to every municipality from reliable government sources. But as yet this is not the case.

What experiments have been carried out are, moreover, generally in relation to the disposal of municipal and not private residential sewage. While it has been apparently amply demonstrated that the activated sludge process can be accomplished not only efficiently, but also economically for municipal plants, the following letter kindly sent in reply to a request on the matter illustrates the point:—

Replying to your favor of December 4th, I would state briefly that in my judgment there is no probability of economically applying the activated sludge process to small domestic sewage plants. The machinery necessary to instal and the care with which the operation of the plant must be supervised precludes all thought of installing such a process in domestic plants.

Very truly yours,
(Sgd.) T. CHALKLEY HATTON,
Chief Engineer,
City of Milwaukee Sewerage Commission.



SEWAGE-TANK GRAVEL TRENCHES AND OUTLETS FIG. 1

There have been many bulletins prepared on the matter of disposing of sewage from residences, but too many of them are merely compilations from other bulletins or books. There has been little attempt to find by experiment or experience the best method under the conditions for which the bulletin is written. The method of sewage disposal described in various bulletins of the New Hampshire State Board of Health are, however, methods that have, according to these bulletins, been developed from actual experience. Such methods could not by any means be advocated in all cases. Further, the very essential principle of the intermittent application of liquid sewage to the soil is not recognized or embodied in any of the methods. But before we criticize, let the following facts (not theories only) in what is to follow speak for themselves:

A few years ago, following the enlargement and improvement of water supplies in villages and summer resorts, the sewage question became quite serious. There were outcries from such places as Sugar Hill, Wolfeboro, Farmington, Sunapee Lake, etc., because the wastes discharged in the open, or into cesspools, were creating intolerable nuisance and very unhealthful conditions. Some summer resorts were losing patronage; academies were losing pupils because of offensive conditions about the premises, which made them literally "in bad odor." Villages and small ru-

ral communities like these are usually spread out over considerable territory, have but a single locality or none at all which may be styled "compactly built," and come far short of the financial ability needed to build a sufficient, extensive system of sewers of standard pattern. Often the water supply of such places is not sufficient for the proper operation of a long line of pipe sewers anyway. Again, supposing the pipe sewer to be in place, the problem of proper disposal of the outflow may be nearly as expensive and troublesome as that of the sewer itself. Also, where houses are so separated, as in many villages, the very burdensome tax for constructing the main sewer would be followed by a large additional expense to the majority of house owners for making a long connection with the sewer. Moreover, the reasonable opposition of leading citizens to works for sanitation which are obviously too costly for them to undertake, would have to be respected by any Board of Health, whatever might be its legal authority.

At Sugar Hill it was evident at once that a system of separate units of small cost must be adopted. Any co-operation between more than two or three neighbors was out of the question. Hence plans were submitted to the health officer for plain, rectangular tanks, which after some experience were modified and much simplified, varying in size from those for a single family to those for summer hotels housing from 200 to 600 people. It was at first proposed to discharge the effluent into gravel-filled trenches and keep it out of sight. But according to a State Board of Health Bulletin, issued in 1912, "under the conditions of high altitude and large open spaces there existing, the nearly clear effluent gives no offence when flowing in shallow trenches in the meadow grass." Within two years more than thirty-four such tanks were built, varying in size from 6 x 3½ x 4½ feet, for 15 or more people, to 25 x 11 x 6 feet for a hotel said to shelter 600 or more, including the help. These all worked so well that a wonderful transformation was made in the sanitary situation. All nuisances were done away with, even the flies. The high reputation of this famous mountain resort was restored. Old visitors and friends expressed their delight at the change by unsolicited testimonials, and new visitors came in greater numbers."

Wolfboro, N.H., on the shore of Lake Winnepisaukee, presented a difficult situation. Irregularly spread out on the two sides of Smith river, which flows from the tributary, Lake Wentworth, having great alternations of surface, from high hill sections to low lying districts along the lake margin; with a fluctuation of more than four feet in the level of this great body of water; and some houses so low down that the basements were liable to flooding when the lake level was high; it was a serious question how to avoid polluting the lake by raw sewage. On a low-level street along a naturally stagnant bay, conditions were very offensive, and there were many neighborhood nuisances from old privies, cesspools, etc. An adequate intercepting sewer would have soon descended below lake-level and required a pumping station; and the logical requirement would have been a filtration plant with other facilities for more or less purification of the sewage. But for this community such works were, in a financial sense, "unthinkable."

A topographical survey of the greater part of the village was first made, so as to show location of all houses and

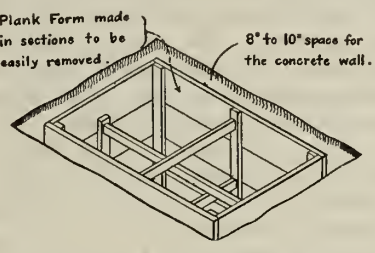
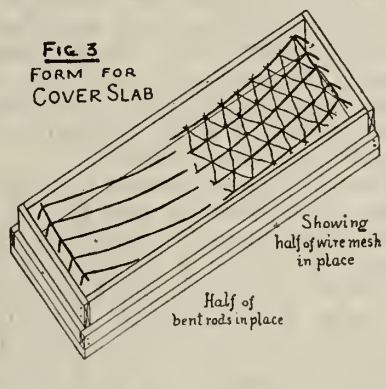


FIG. 2.— BRACED FORM FOR BUILDING THE TANK WALLS.



streets, and the elevations of same by contour lines. Then, by a study of the map, the territory was divided into small sections or groups of houses, each of which could be served by a small sewage tank suitably located to discharge the effluent into the lake at points where no objectionable conditions would be likely to result. Three such tanks have been built and are reported to have accomplished the intended purpose satisfactorily. Besides this, the Brewster Academy, a church society, and others, have put in separate small tanks on their own account, to the number of six.

Here the principle of dilution was applied; the partly purified effluent has a submerged discharge into a body of water of unlimited extent. The water supply of the town is from a distant source on the hills. "Success in this case," says a Bulletin issued in 1915, "as at Sugar Hill, was largely due to a very efficient health officer determined to have the right thing done, who here was heartily supported by the Board of Selectmen."

At Farmington, N.H., a sewer had been planned to discharge raw sewage directly into Cocheco river, at this point a rather small stream. The State Board of Health would not sanction this, but prescribed a sewage tank with efflux into filter trenches. The number of people served is more than a thousand, but many of these were workers in three shoe factories, of whom a part resided outside the sewer district. The lower reach of the sewer is in wet, gravelly ground, and takes in considerable ground-water, which interferes with the proper action of the tank. Of the conditions at Farmington, the president of the State Board of Health, Mr. Robert Fletcher, Ph.D., C.E., stated in 1915 as follows: "For some time the tank was not covered according to directions and did not receive continuous and interested attention owing to yearly changes in the Board of Selectmen. Hence, it has accumulated sludge rapidly, and the effluent was not improved by passage through a syphon chamber and the attempted aeration in the filter trenches. The best results have come from discharging the effluent directly from the tank. This effluent has been nearly colorless, without appreciable odor; and two samples have stood eight months on the writer's table almost unchanged—looking like nearly clear water and showing no tendency to putrefaction."

Another great improvement of the sanitary conditions in Farmington was made when the Selectmen put in an extensive system of large pipe drains which had made an unhealthful situation in some places. This example should be followed in other towns which suffer ill-effects from lack of good drainage of the subsoil."

It will be noted that Mr. Fletcher has nothing to say in favor of the syphon, but, on the contrary, found the best results when the effluent was discharged directly from the tank. Of such effluents he, however, states: "Although a proper effluent from such a tank appears fairly clear and transparent, it is sewage only partly purified; it contains organic matter and usually objectionable bacteria so that it must not be allowed to find its way into any source of water supply." For a sanitary method of sewage disposal the final effluent should be pure, i.e., free from objectionable organic matter or disease bacteria. This, the writer has found, as a rule can be most nearly accomplished only by applying the sewage intermittently whether above or below ground and whether or not special filters are provided. The

reason for this has been given in various articles published in the SANITARY ENGINEER. The general experience, as far as the writer knows, with the continued application of sewage to filters or ground, where no rest is provided, is that not only is the resulting effluent insanitary, but that frequently clogging will also result. This latter condition has apparently not occurred in New Hampshire, where it was known in 1915 that at least 174 tanks had been in use and where it was claimed that the reports, with but two exceptions, have all been favorable. "A few complaints have been proved to be due to wrong management or wrong conditions easily corrected after intelligent management."

One important feature of the 1915 Bulletin referred to, is the full directions given for the construction of this "free-flowing sewage tank" defined as "a plain, rectangular box, preferably made of concrete, about five feet deep and with a length at least one and one-half times the breadth, receiving only domestic sewage, which enters by an inlet pipe submerged 18 to 24 inches below the surface of the tank contents, and which has a slow and regular flow to the outlet pipe which is also submerged 18 to 21 inches..... The cover of such a tank must be at least one foot above the scum which forms, and must be tight enough to exclude light, and so that the gas pressure from within will exclude the air. At least one opening should be made in the cover so as to give access to the inside when necessary; but this must be tightly closed and no vent in the cover is allowable." The so-called "free-flowing sewage tank" is evidently the well known "septic tank," but it was evidently so termed to distinguish it from a "stagnant cesspool" where no "septic process" can take place. For reasons previously stated, a septic tank, it is believed (in spite of the bulletin to the contrary), should be vented.

Figure 1 shows the tank in longitudinal section and the arrangement of inlet and outlet pipes. The walls and bottom are of concrete deposited between the plank forms and the face of the excavation, as shown in figure 2. The planks or thick boards of the form should be in sections of uniform width so as to be put in successively as the wall rises; as it is better not to try to deposit concrete behind a form-section much more than two feet deep. One set of forms carefully used may serve for making several tanks.

Detailed information for the making and placing of concrete is given in the Buleltin. The following in regard to the thickness of walls and as to forms, cover, etc., may prove valuable to some readers.

The walls need be only six inches thick on top, but should be ten to twelve inches thick at base, or even 16 inches for walls 7 to 8 feet high, or more. As the inner face must be vertical and as the ordinary trench-face in earth, six feet or more deep, cannot be undercut very much with safety, it is usually preferred to make the wall of uniform thickness, or draw it in by steps.

The sketch shows that the forms must be stiffly braced, especially if only boards are used. Two-inch plank are better and need less bracing. Wet concrete exerts strong and insistent pressure and, unless resisted, will bulge the forms enough to require considerably more concrete.

In order to hold the hanging lengths of the inlet and outlet pipes in the tank while cementing the joints, they may be tightly wired to the upper sides of the bends and thus supported until the cement hardens. The mixture for the joints might be one cement and one-half part sand. It is usual to lay glazed pipe with the bell-end up grade.

Of course, the walls may be built of brick or stone masonry, laid water-tight, in localities where this form of construction is preferred.

The cover may be of two-inch plank. In any case, it must be strong enough to hold the thickness of a foot or more of earth and sustain the weight on a wheel of a loaded cart, if such should happen to pass over it. As the dampness of the earth above and from the liquid below would cause the plank cover to decay in a very few years, concrete is much to be preferred.

To make a cover, proceed as follows: Make a flat box-form (see Fig. 3), 5 inches deep, 16 to 18 inches wide (according to number of slabs needed for the length of the tank), and long enough to overlap 4 inches on the walls. Mix some cement mortar (1 of cement to 2½ parts of clean mortar sand), or if clean gravel is convenient, with all stones larger than one-half inch sifted out, use concrete mixed 1 part cement, 2 of sand and 2 parts of the fine gravel. Place a layer of this mortar or concrete (thoroughly mixed) over the bottom of box (previously wet), three-quarters of an inch thick. On this lay pieces of iron rods or heavy wire mesh or strips of "expanded metal," bending the ends upwards gradually three or four inches. Then fill up the box with the mortar or concrete gently tamped and trowelled at the edges so as to make smooth sides and corners. It is well to smear the inside of the box with soap or oil before putting in the concrete. Smooth the upper surface of the slab with a broad trowel. Enough metal reinforcement requires about four-tenths to half a square inch of metal to each foot of width of the slab. It is assumed that the clear span of the slabs would be about five feet. For spans of six or more feet they must be made stronger. The 5-inch slabs 17 inches wide, would weigh 420 pounds, if 5 feet long; a 4½-inch slab about 370 pounds. Hence, one of these may be removed easily when access to the inside of the tank is desired. Each slab should have about 48 to 60 hours to set before handling it. Then it may be carefully tipped over and the form removed to be used for another slab. If it is not handled gently it may be cracked and would then be nearly useless.

(Continued in next issue).

TORONTO FILTRATION PLANT

(Continued from page 21)

the system. The drifting sand passes over the top of the stationary sand bed down to a system of outlets or extractors, and thence by pipes to the sand washer. Here the sand falls to the bottom through a current of raw water and is picked up by an inductor. The dirty water passes upward and out at the top of the washer. The sand extractors are of such form that the sand is kept out of the piping system except when the inductor is in full operation. Within the sand washer the raw water pipe is in the form of a venturi tube, and the drifting sand collected and washed in the washer is inducted into the raw water at the throat of the venturi tube. This sand passes up the standpipe with the water and is delivered, with it, above the top of the sand bed, forming a cone which continuously drifts away and is continuously being replaced. Under the gravel bed is the filtered water collecting system.

Continued in next issue.

WATCH YOUR CONDENSATION

"Watch Your Condensation" is the title of a book being issued to the trade by the Canadian Sirocco Co., Windsor, Ont. The book contains some very valuable information regarding condensation, the value of return water to a steam plant, and various methods of adopting the use of their Detroit steam traps, of which there are a number of styles shown, as well as modern methods of installing steam traps. Without doubt most heating engineers have not given the question of "How shall I get the return water of condensation back to the boiler" as much attention in days gone by, and books such as that mentioned cannot fail to be a great aid to every heating engineer procuring one. They can be had for the asking from the above-named address or their Toronto office, 526 Traders' Bank Buildings, Yonge Street, Toronto.

Main House Trap Championed

The Sanitary Engineer's Challenge Taken Up—Several Other Interesting Questions Voiced in Championing the Long Maligned Main House Trap—Why Not Keep Up the Discussion for a While?

Editor THE SANITARY ENGINEER, Toronto, Ont.:—

THE artice in the columns of the SANITARY ENGINEER of February 1, as to the desirability of utilizing the soil pipes of houses for the purpose of ventilating the main sewers, prompts me to enter my protest against such a rule being permitted to be introduced in any but exceptional systems of sewerage and of house sanitation in Toronto.

The gases that are produced in a properly-constructed main sewer need only be a source of danger when the refuse from patients suffering from typhoid, or other similarly contagious diseases, passes into it. In that case, the exclusion of the exhalations from the house drains, by means of the trap, prevents the spread of disease; and to introduce a current of air from the sewer into the surroundings of the house, would be attended with danger, as the occasional and unavoidable leaks would, until discovered and repaired, tend to disseminate disease. I have recently had examples of the ill effects which arise from direct communication between a building and a main sewer, which has proven it would be wrong in so many cases.

One case is when continuous drainage to sewer was used. I find in a great many cases in winter where the vapor from sewers forms hoar frost in top of vent pipes going through roof; this creates a plug, causing traps of plumbing fixtures to syphon, leaving free ventilation from sewer into the home. What would it be if every house had continuous drainage? What would be the result in unoccupied houses from evaporization and drying up, or frost, etc., in fixture traps inside of houses?

I was asked my opinion as to the sanitary condition of an establishment; and the result of an inspection showed that owing to the absence of a trap, the sewer gas from the main sewer had free access to the building, and a chronic state of sore throat, and other conditions, had been the result. This, of course, indicated a bad state of the main sewer. But how is a householder to know that the main sewer is perfect? He is only safe when his house is entirely cut off from the sewer. By properly trapping the building I refer to, the foul gases and smells disappeared; a healthy condition was established, and many valuable lives rendered more useful than previously.

This is an important question, and we sincerely hope that the trade as a whole will once and for all place on record their experiences regarding the matter. We will reserve space in The Sanitary Engineer for the purpose of free, sincere, practical discussions.

EDITOR.

I advise the introduction of ventilation at more frequent intervals on the main sewer than they are generally placed, and rely on the natural pulsation, which occurs by the rise and fall of the fluid in the sewers during the twenty-four hours, to force out the sewer gas. In its diluted form, mixed with the air in the open, it is less likely to produce mischief than if it is drawn in the direction of our homes, as is advocated by those who would abolish traps. I say confidently that the experience of some sanitary engineers in Toronto points to the necessity of effectually trapping every building from the main sewer, and of providing a sufficient air flush on the house side of the trap, for the purpose of purifying the air in the drains and soil pipes, by maintaining a constant current of air from the house drain ao the highest part of the house.

The question of retaining the trap placed on the line of the "house drains" between the house and the public sewer, is very important, and under the existing system of sewers, cannot be dispensed with. Even with the most perfect system of sewers, as carried out by the best modern experience, I could not recommend the rejection of the trap. It may, of course, be argued that every trap is a direct loss of scouring power, and so it is; but we must be satisfied to accept this compromise. It is a safe principle, I believe, to lay down all modern house drainage work so as to cut off, "disconnect" and ventilate, that the house may be harmless from sewer air. The theory that sewer air should not be found in properly constructed sewerage systems is not borne out in actual practice, and until it is we cannot do away with the trap in question. If the trap on the line of house drains be done away with, you will ventilate the public sewers through the soil pipe and other ventilating pipes of house drainage systems, and form a ready means of carrying contagion from house to house.

Up-to-date doctors say: "Air admitted by ventilation above the "seal" and passed all through a trapped house drain is found, by experience, to be fouler than air drawn from a sewer." I think there is a nice question raised here, and one that should receive some notice and thought. The question is: "What is the difference (if any), between real sewer gas (that coming from main street sewers) and the odor arising from human excrement and other deposits held or remaining in running traps in houses? It is not the plumbers' province to analyze and explain the effects of sewer gases, whether from the outside or inside of a dwelling. We accept the opinion of medical men: that sewer gas is not beneficial to mankind. Therefore, it is our duty to study and learn how to prevent it from entering our homes.

I have been told by physicians that odor from human excrement is not unhealthy (I presume if the person who excreted it was healthy), while, again, I have been informed by scientific men that with regard to persons suffering from certain diseases, their excrement passing through sewers is contagious. That is, that the diseases of such persons will pass from house to house by means of the drain. Now, if such is the case, then how important must be the running trap; for by this means, if properly fixed, we can prevent it.

My object in dwelling so long on this particular point is to give force to the objection; and whether this objection as to "air admitted by ventilation above 'the seal' is not well taken," my mind regarding the necessity of the running trap is unchangeable. I adhere to this principle firmly. While the article referred to advises the abandoning of all such contrivances, on this particular question I differ from the writer.

The rule, in fact, should be that the union of any house pipe whatever with the outside drain should be broken both by water and by ventilation. I also am of the opinion that private residences should not be made into ventilating shafts for the relief of sewer gas. Every precaution should be taken to keep it out, as we would a thief, and far more so, because he takes what we may replace, while sewer air rohs us of that which nothing can restors.

(Signed), John Wright,
Chairman of the Sanitary Committee of the Toronto Society Sanitary and Heating Engineers.

Practical Sanitary Engineering

The First Course of Its Kind Ever Published in Canada—Specially Prepared for the Craft Coming Up, as Well as Those Who in These Days Construct Work Simply Because the "By-law Says So"

BY THE EDITOR.

ARTICLE 4.
Atmospheric Pressure Continued

SYPHONIC action, centrifugal motion, and capillary motion are all subjects of value to every sanitary engineer, and all bear some relationship to atmospheric pressure. For instance, why do we vent traps? What is the real law governing the venting of traps? Not the "by-law," but the nature law. Let us answer this question by taking up the subject of syphonic action first.

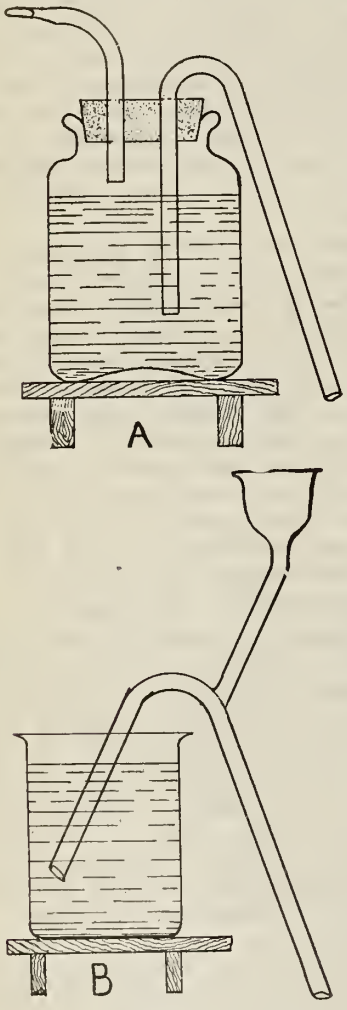
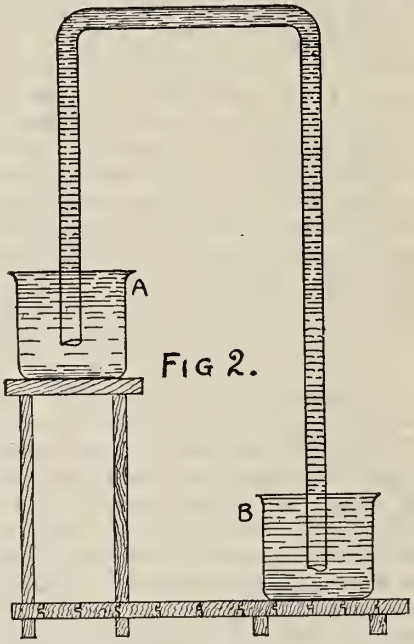


Fig. 1.
Showing five forms of syphons.

Fig. 1 shows a number of small syphons. The method required to put them in operation is shown by the various types. A shows a syphon which would require air to be blown or forced through the spout, thus increasing the pressure upon the surface of the water in the vessel to such an extent as to force water above its normal level through the tube. It will be noted that the outer leg of the tube is longest, and once the column of water in the long leg is greater than the short one, and as long as the surface of the water is higher than the lowest point on the long tube, the water will flow from the vessel.

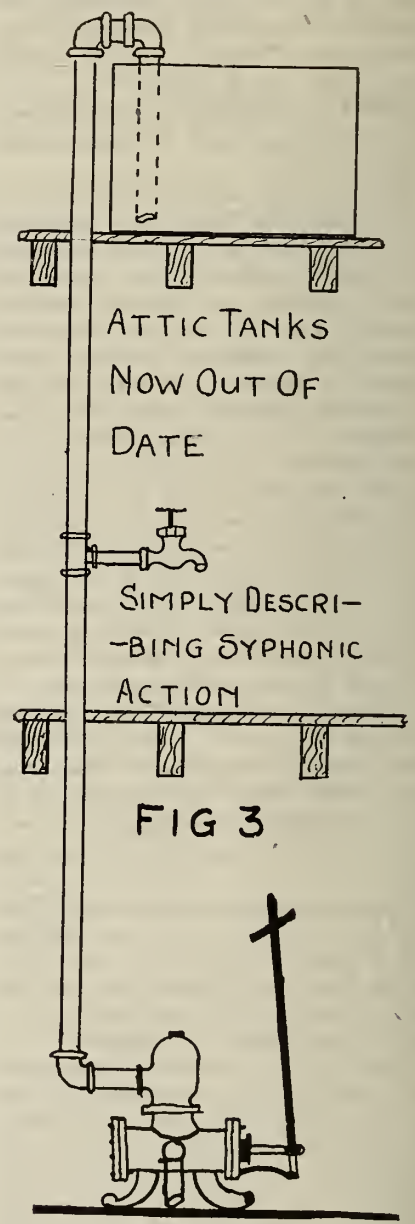
B shows another form of syphon which operates in much the same way as would the syphoning of the water from a sink trap or lower fixture than the one discharged.

Two conditions may arise or be the cause of the water being drawn from a trap. One in which the column of water above is apt to form a solid water piston above the outlet or branch to the sink or lower fixture, and thus drive the water upward into the fixture. Then having passed the branch, there is a suction formed which, along with the increased head of water in the trap, will cause the trap seal to be broken. Second, if the head of water discharging from a higher fixture is not so high as to form a water piston, which, however, is formed below the branch, and the terminal at the roof is closed or partially closed. Then, of course, the water in the trap is liable to be drawn out and the seal broken.



If both legs were of equal length no syphonic action would be set up.

Do not let this explanation appear to confuse, and therefore remember that not only is the water piston responsible for syphoning the water out of the trap, but also the atmospheric pressure which was being exerted upon the face of the water in the lower trap had something to do with this action.



Water in tank is syphoned by drawing water at tap.

Just let us refer to the statement made in a previous article that sanitary engineers should try to bear in mind that air is solid, or will act in the same way as a solid. If air is blown through the

(Continued on page 28.

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THE SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

The only Canadian Paper Published in the Interest of the Sanitary, Heating and Ventilating Trades.

Established 1907.
Published Twice a Month.

143-153 UNIVERSITY AVENUE,
TORONTO, CANADA.

WE WANT YOUR OPINION--THIS IS IMPORTANT

Dear Sir--

The question of using clay tile pipe under dwellings is being discussed just now in many districts, and some persons are taking the stand that cast iron soil pipe is too costly, and is no improvement over clay tile pipe. We are therefore taking the liberty of asking you for your valued opinion on the matter. Just fill in the spaces below and return the sheet to us in the enclosed envelope.

1. Do you favor the use of clay tile pipe under dwellings or buildings ? If so, why ? .....

.....

.....

.....

2. Do you favor the use of cast iron soil pipe (medium or extra heavy) under dwellings or buildings ? If so, why ?

.....

.....

.....

3. What is the law regarding above questions in your town ?

.....

.....

.....

Signed.....

ess.....

We have mailed a number of copies of the above to some of our readers and are receiving a splendid response. We want every reader to record their opinion as soon as possible.

Tear out when duly filled out as requested and mail by return to " The Editor."

THE SANITARY ENGINEER

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MARCH 1, 1917

LETTERS FROM THE EDITOR

DURING this year the editor of THE SANITARY ENGINEER intends to send a letter to every reader of this journal asking one or more questions that are of vital importance to the welfare of the trade. These letters will be mailed under separate cover and an addressed envelope will be enclosed for reply.

The letter will also be reproduced in THE SANITARY ENGINEER following its mailing to the reader. This will enable every reader to answer every question. The first of these letters has just been mailed and a copy of it appears on another page. We sincerely hope that every reader will show us that he is really interested in the work we have started. The question may not be of particular importance to every reader, but rest assured every answer is needed for some purpose or other by some readers in various localities. We are living in a big country and know so little how our fellows in another part of the Dominion are getting along that if we can help one another find out more about each other so as to help fight each other's battles, we can rest assured that many of the evils now being borne by one another can and will be eliminated. We sincerely hope that every reader will answer the questions that appear on another page. Answer them promptly so that the answers can be used at once.

There are quite a number of towns and cities in the Dominion that are re-modelling their plumbing by-laws. The Ontario government have the matter of a provincial plumbing by-law under consideration and we want to have information of various kinds all filed on hand to place before both the provincial and municipal authorities when required.

Just at this time several towns have clauses in their by-laws which demand that cast iron soil pipe be installed under buildings, and there are movements on foot to set aside these clauses, merely on a matter of cost. Cost price seems to be the most important item, not the health of the community.

A Mr. H. Cleaver of Burlington, is our latest opponent, he appears to know little about the matter and allows drain diggers to persuade him that clay tile pipe is the best. He is passing as an economist in dollars and flouts health in the face.

The situation is painful. He is citing Toronto and Hamilton as examples, which proves his own as well as his adherents' unfitness to discuss the matter. Why does he not quote new towns or cities, little and big, Ottawa, Oshawa, Oakville, Stratford, etc.?

Why does he not consult men above the level of drain diggers, whose only ambition is to lay tile pipe irrespective of its merits or demerits? Mr. Cleaver may save Burlington $10,000, but, if so, it will have that sum to spend on coffins or medicine. Were practical men consulted in Hamilton and Toronto, the clay tile pipe under buildings would be a thing of the past.

Furthermore, in these two latter cities all the most valuable buildings have cast iron drains installed, such, for instance, as the new union station, the banks, Government House, the General Hospital and every residence of note. Moreover, when a resident, building a home for his own use is given an honest explanation about tile or iron drains, the latter is always preferred. Mr. Cleaver is being misguided and misled, and is attempting to economize in dollars for the people of Burlington, but actually risks doling out death. He has not to pay the price, but the people of Burlington will, and sadly too, if they are deluded into setting aside one of the most important clauses in their plumbing by-law, a clause which ensures the prevention of making every basement or cellar in Burlington a possible insanitary enclosure.

A NEW SERIES ON LAW

IN this issue a new series of articles will commence, which will deal with various legal points connected with business that will prove of great interest to every reader of THE SANITARY ENGINEER.

Many cases of a legal nature crop up in the course of every business man's life, that he would like to be better posted upon, and if any question arises in which we can assist our readers we will be only too pleased to do so. The first of these articles takes up the question of collecting interest on overdue accounts. We know that while many concerns have a notification on their statements saying that 7, 8 or even 10 per cent. will be charged upon overdue accounts, this interest is seldom collected, owing to the fact that the money is always welcome and acceptable when it does materialize, and the question of collecting interest, even though it is distinctly stated that interest will be charged is very seldom insisted upon.

Now, why not collect interest? Some say it cannot legally be collected, while some assert that it can. However, the real solution of this question appears in the articles entitled Charging Interest on Overdue Accounts and a careful reading of this series cannot fail to be of great value to every sanitary and heating engineer in the Dominion.

WATCH THE MARKET QUOTATIONS

WE have received quite a lot of compliments from readers of The Sanitary Engineer for the way we are publishing market quotations and particularly so on account of the close relationship between these quotations and the "cost of doing business" articles. One reader said the other day that he had actually been selling at a loss, on account of just adding a certain percentage and as the prices had gone up he had not increased the percentage. Our reader cited gasoline, when he was paying 16 cents he was adding 3c per gallon. To-day he is paying nearly twice that price and only adds 3c just the same. Another reader had done the same practically with a large quantity of brass goods and cast iron soil pipe.

If one's stock costs more by the piece or pound, the selling price should always be the basis of percentage charges, both the instances mentioned are only a few of the many, and with the price of goods soaring as is the case today, it behooves every reader to watch the market quotations and tendencies and be governed in both their buying and selling accordingly.

THE MAIN HOUSE TRAP AND BREATHER

FOR nearly three years The Sanitary Engineer has published articles about the use of the main house trap and breather. We have shown in as forcible a manner as possible the true conditions which prevail when these appliances are used. We have cited all manner of proofs why they should be discarded, and have never had a challenger take up the opposite side of the question.

However, at last we are taken to task. Our challenge has been accepted and a defence of the main house trap has been sent in. This defence appears on another page in this issue, and we sincerely hope that those who see eye to eye with the defence put forth will send in their appreciation, and, we also urge upon those who do not agree with the use of the main house trap and breather to take action and send in their answers to the defence. It is a bigger question than many are apt to think and we sincerely hope that the discussions upon the subject will bring matters to a more satisfactory conclusion. We know our correspondent is sincere and is voicing his own honest opinion as well as the opinions of others. But seeing that the champions of a clear line through from sewer to house top have never been opposed, they were unable to refute any reason why the main house and breather should be used. Now, however, the matter is on a different footing, and there is something to work on. May we have the privilege of publishing a number of good letters from our readers on this important question in future issues of The Sanitary Engineer?

CIVILITY AS A BUSINESS ASSET

IT is only a decade or two ago that Jay Gould, the railroad magnate, stated the business standards of his time in the well-known phrase, "The Public Be Damned." It was not a word used in anger, merely a statement of policy. It was followed out in the railways of the Gould system. It was followed out on other railways. With what result? As one writer on the subject states: "Every woman who was insulted by an underling railway employee went home and taught her children to fear God and hate a railroad." These children growing up into manhood did not forget the lesson, and out of this feeling grew the mass of anti-railroad legislation of recent years. Even trifles will cause a prejudice and prejudice is no trifle. It has cost American railroads twenty years' labor and millions of dollars to, in a measure, eradicate a feeling that common courtesy would have smothered in its infancy. More and more great corporations are realizing this. The management of one large chain of stores, outlines the policy of the business in the phrase, "The public is always right." This is the extreme in the other direction. The idea is that it is better to lose money by the mistakes of a customer, than to lose the good opinion of a customer, through lack of consideration or civility on the part of the store.

DON'T forget to fill up and sign and tear out page 17. It's an important matter and the public will appreciate the stand taken by the trade long after the cost is forgotten. Every city allowing tile pipe drains within the walls of a dwelling, belongs to the plague courting class.

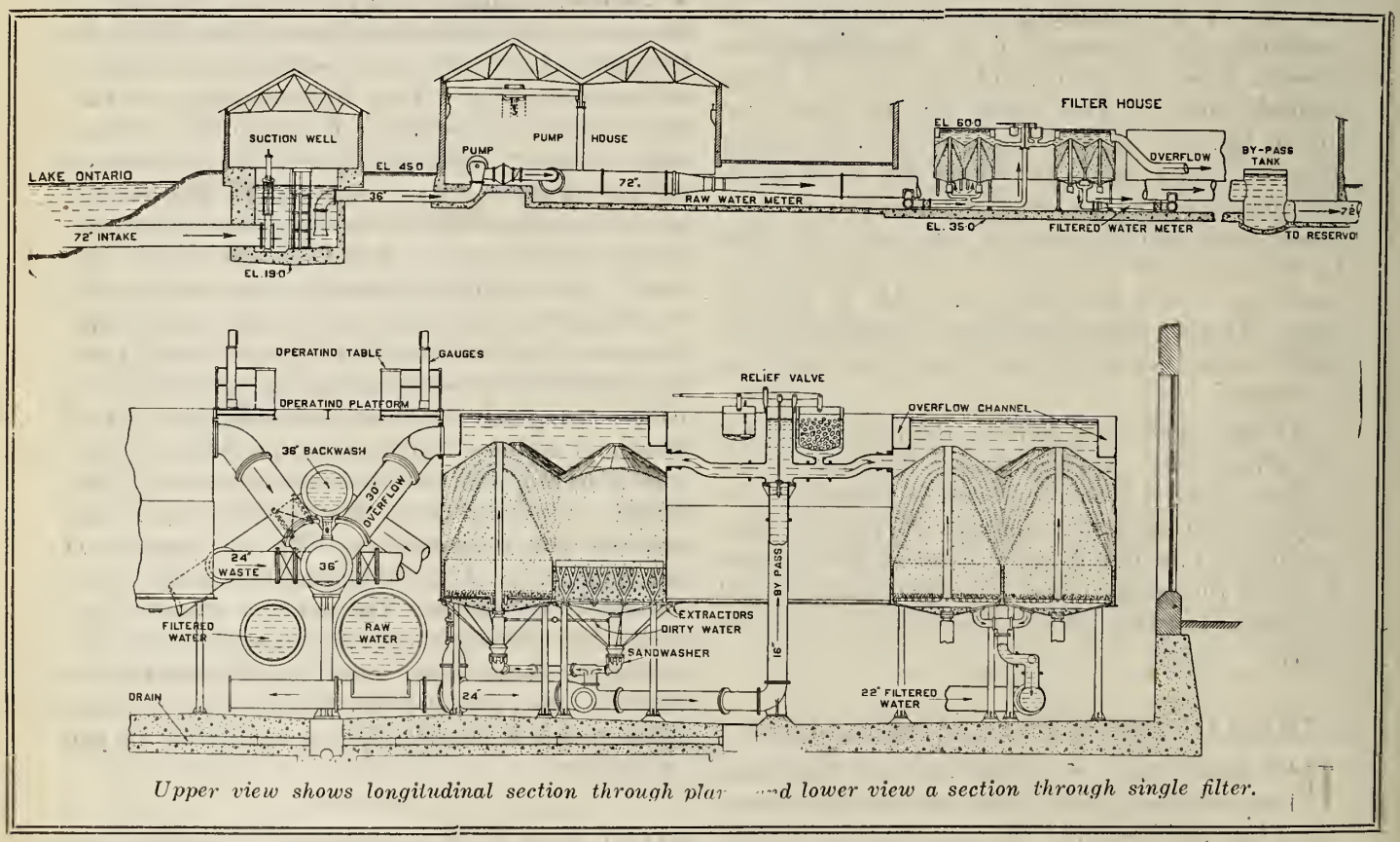
60 Million Gallon Drifting Sand Filtration Plant City of Toronto Ont.



A plant of the nature here described and illustrated embodies in its make-up and result accomplishment features of interest alike for the sanitary engineer and private citizen, no matter their community or national location; the necessity for pure water, either for consumption alone or as a food constituent being generally recognized as a public health essential.

By A. G. Webster.

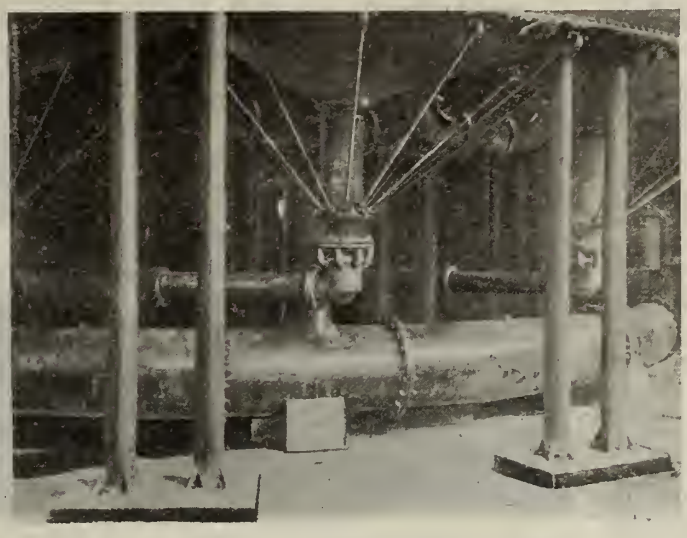
THE new mechanical filtration plant at Toronto Island, which has been under construction since the fall of 1914, is now practically completed, and some filtered water is already being delivered to the city. An additional supply of pure water for the city of Toronto became imperative owing to the rapid increase in population, the slow sand plant installed being altogether too small for the requirements. Owing to the condition of the water in Lake Ontario, some form of filtration is necessary. After considerable investigation the city authorities decided that for the new plant mechanical filtration was more suited to local conditions than the slow sand system. Specifications and plans were accordingly prepared under the supervision of Works Commissioner Harris, and tenders on same were received in January, 1914. In June of the same year the tender submitted by the John ver Mehr Engineering Co., of London, England and Toronto, as engineers, and William Cowlin & Son (Canada), Ltd., of Bristol, England, and Toronto, as contractors, was accepted for a Ransome mechanical type drifting sand filter, with a capacity of 60,000,000 Imperial gallons per 24 hours, and at a contract price of $1,066,282.



Upper view shows longitudinal section through plan and lower view a section through single filter.

When the city of Toronto contemplated installing an additional filtration plant, the John ver Mehr Engineering

Co. solicited consideration of their system. The request being granted, the company proceeded to erect a demonstration plant on Ellis avenue, West Toronto, for the purpose of proving the efficiency of their system and its suitability to local conditions. The plant was constructed during the spring of 1913 and turned over to the city for the official test on May 21. This continued until June 27, 1913, operation being closely watched for a period of one year. The results of the test were highly satisfactory, and were the subject of a report issued by Drs. Geo. G. Nasmith and Fred. Adams, of the Department of Public Health, Toronto. The plant at the Island was designed by the John ver Mehr Engineering Co., of which William Gore, M.Inst. C.E., is the consulting engineer, and William Storrie, A.M.Inst.C.E., is the chief engineer. It is the largest drifting sand filtration plant yet installed, and the largest filter plant of any type in the British Empire. The construction and operation features have aroused considerable interest among engineers in both Canada and the United States. The company has constructed smaller plants of the type in Great Britain, Brazil, Jamaica, etc.; in addition, they have supplied portable units for use at the various Allied battle fronts.

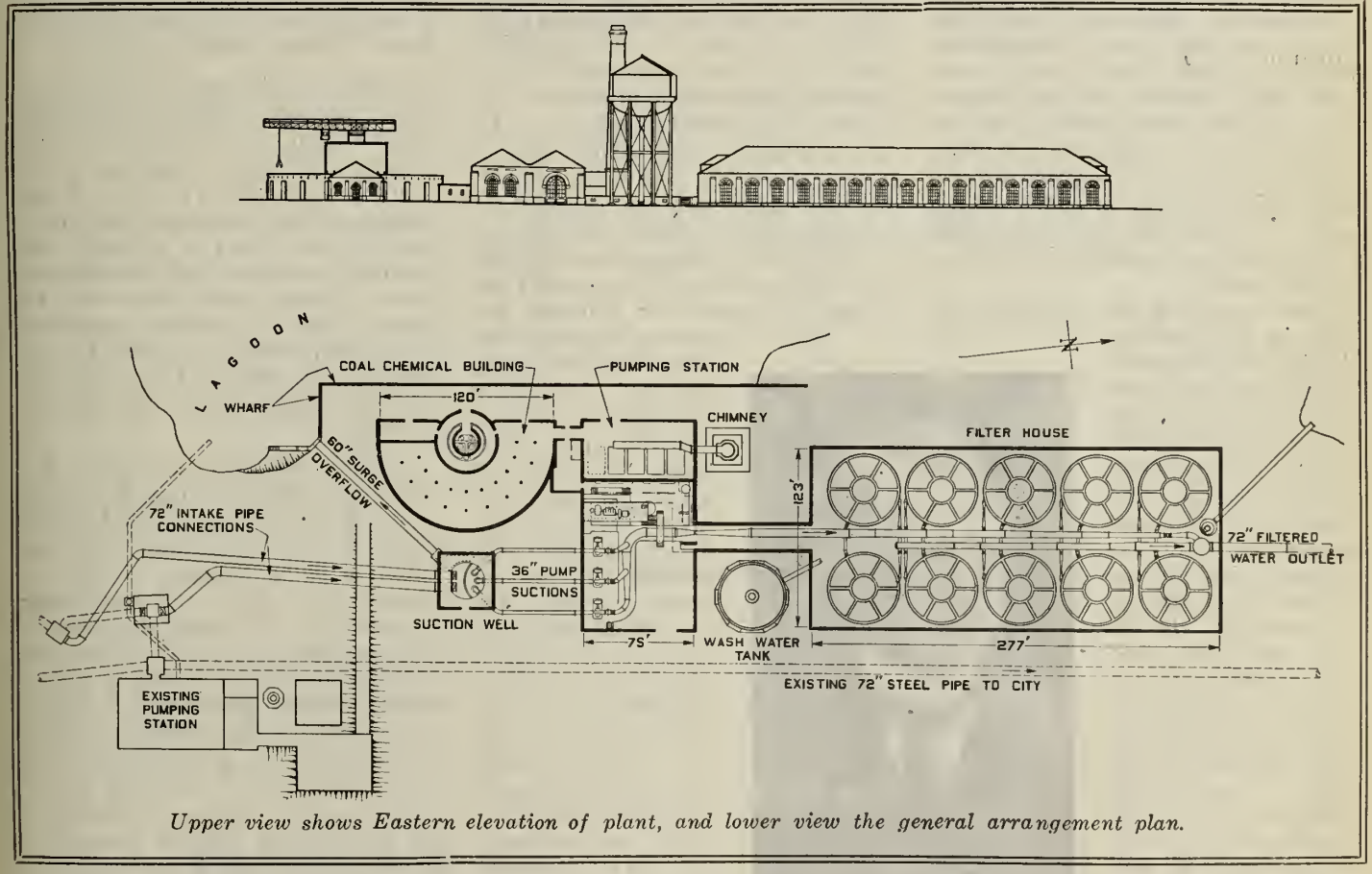


Sand washer underneath each filter, there being 30 sand washers to each unit.

The plant as already stated has a contract capacity of 60,000,000 Imperial gallons in 24 hours, but must be able to operate at a rate of 72,000,000 Imperial gallons for 10 hours. An important feature of the drifting sand system is its ability to filter unusually turbid water without excessive clogging of the filters, thus obviating the necessity of frequent shutdowns to wash the whole bed of filtering material, which is done without using large settling tanks and coagulating basins. The coagulant, sulphate of alumina, is introduced in the raw water in the suction well. This water is then pumped to the filters. The sand bed in the filters is composed of fine sand 9 feet deep, laid on a bed of gravel 9 ins. deep. The action of the influent causes the upper part of this sand bed to drift across the water being filtered, the bulk of the impurities being swept out, together with a part of the drifting sand, the latter being washed and returned to the bed by the circulation of the water. The lower portion of the sand bed which remains stationary removes the remaining impurities in the water. The stationary sand bed is washed by reversing the flow of filtered water at long intervals.

The raw water enters the filter through a standpipe (see cross section of filter), in the centre of the unit, after passing through a sand washer at the bottom, and delivers above the sand at the top and also through a vertical by-pass. The sandwasher is an important feature of

(Continued on page 14.)

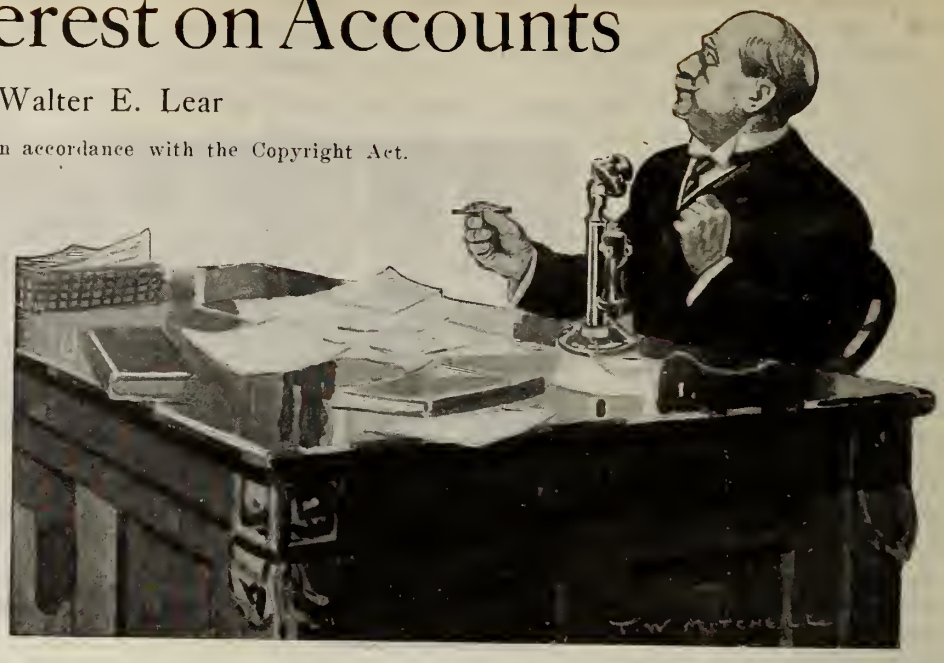


Upper view shows Eastern elevation of plant, and lower view the general arrangement plan.

Charging Interest on Accounts

By Walter E. Lear

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Is it legal for a merchant to charge interest on accounts? If so, when can he start to add interest? And how much interest can he charge under the law?

YOUR question is simple enough as asked, but to give you a short, simple answer would be dangerous. The answer to the above question all depends upon the particular circumstances of each particular case.

Let me take the retail merchant first. A customer telephones in an order for goods. The merchant delivers the goods. If this is the first order the merchant has received from the customer and if the customer has not asked for credit for any stated period, then the law presumes that the customer agreed to pay cash for the goods, either on delivery or upon the receipt of an invoice. In such a case, if the customer does not pay up at once, the merchant is entitled to charge 5% interest on the amount so overdue. He cannot charge a higher rate than 5%, no matter how his invoices may be drawn. Statements printed or stamped on invoices to the effect that *interest will be charged upon all overdue accounts at the rate of* 8, 10 *or* 12%, have no effect whatever, in such a case, because the customer did not agree to pay any such rate of interest and it always takes two to make a contract which the law will enforce.

Now supposing the customer has been in the habit of dealing with the merchant and the merchant has been in the habit of sending out monthly statements. Here the law presumes that the customer will pay the account within a reasonable time after it is received. If he does not do so, then the merchant is entitled to charge 5% interest on his overdue account, but no more, because the customer did not agree to pay any rate of interest at all and it is only by operation of the law that the merchant is entitled to charge the 5%. The law permits the merchant to charge the legal rate of 5% interest from the time when the customer should have paid the bill until such time as he actually does pay it.



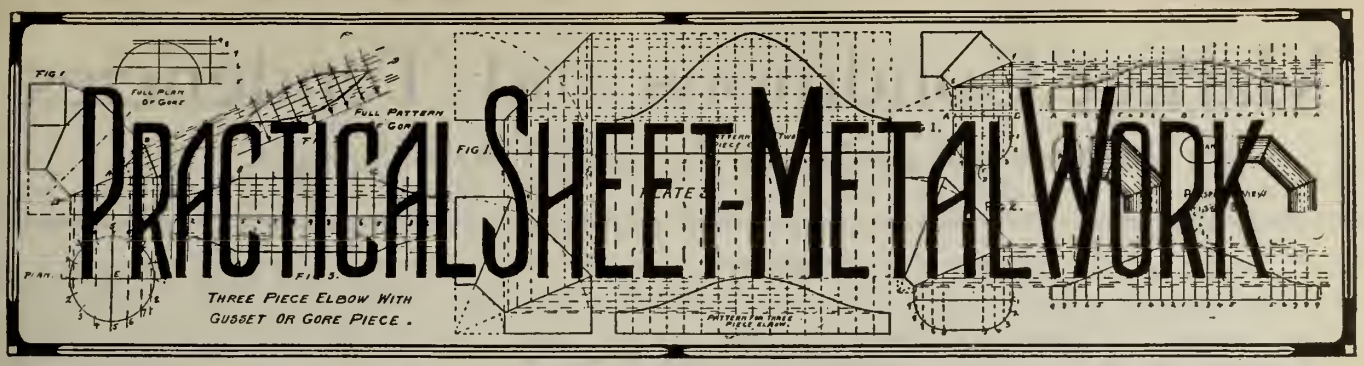
WALTER E. LEAR.

Again, a prospective customer writes in to either a wholesaler or retailer and asks on what terms goods will be supplied to the customer; then is the time for the merchant to mention what rate of interest he will charge on all overdue accounts. He can thereafter collect any rate he mentions in his reply, because *the Interest Act*, Revised Statutes of Canada (1906), chapter 120, section 2, provides: "Except as otherwise provided by this or by any other Act of the Parliament of Canada, any person may stipulate for, allow and exact, on any contract or agreement whatsoever, any rate of interest or discount which is agreed upon." But, if the merchant fails to mention interest on overdue accounts, he will be allowed only 5% interest from the time when they should have been paid until the time when the accounts are actually paid. The letter asking for credit and the reply by the merchant when read together constitute a contract or agreement, provided that goods are ordered by the customer. The merchant cannot collect a higher rate of interest on overdue accounts than the customer has agreed to pay, but the customer must pay at least 5% interest on his overdue accounts, because the law presumes that he will pay his bills as they become due, according to the terms of credit agreed upon.

There is one exception to what I have just been saying as the merchant's right to stipulate for and recover any rate of interest on his overdue accounts. The above is perfectly good law so long as the rate of interest mentioned is so much per centum per annum, but for some unknown reason merchants have the foolish habit of printing statements on their invoices to the effect that interest at the rate of 1% per month will be charged on all overdue accounts."

If such statements are made in a reply to a letter asking for credit, or on invoices, etc., they have the effect of reducing the rate of interest which may be collected to 5%, because by section 4 of the above Act it is provided: "Whereby the terms of any written or printed contract, whether under seal or not, if any interest is made payable at a rate or percentage per day, week, month, or at any rate or percentage for any period less than a year, no interest exceeding the rate or percentage of 5% per annum shall be chargeable, payable or recoverable on any part of the principal money unless the contract contains an express statement of

(Continued on page 25.)



BY THOMAS STANFIELD

In Plate 9 is shown intersection of two pipes of different diameters, the branch or piece being at 45° angle. Make the diameter of the large pipe 3 inches and the branch 1½ inches, the height of the large pipe 4½ inches.

A 1 represents the plan of large pipe struck from centre a, and shown in elevation Fig. 1.

Now draw outline of branch piece represented by B^1 and draw half plan at end of B^1 as shown at C^1 and divide into four equal parts as shown from H 1 to G 5.

Next draw a dotted line through plan as shown at a to 5 and with b as centre drow a circle D^1 to represent another plan of B^1 and divide this with 8 equal parts as shown 1, 2, 3, etc. to 5 and repeat.

From the intersection in D^1 draw horizontal lines intersecting the large circle A^1 as shown at 3^1, 2^1—4^1, 1^1—5^1. 2^1—4^1 and 3^1, from which points erect perpendicular lines; intersect them by lines drawn parallel to the lines of the smaller pipe which have similar numbers from C^1.

A line drawn from E to F through the points obtained will describe the required mitre between the two pipes.

The same course is followed no matter what the diameters of the main pipes or branches be.

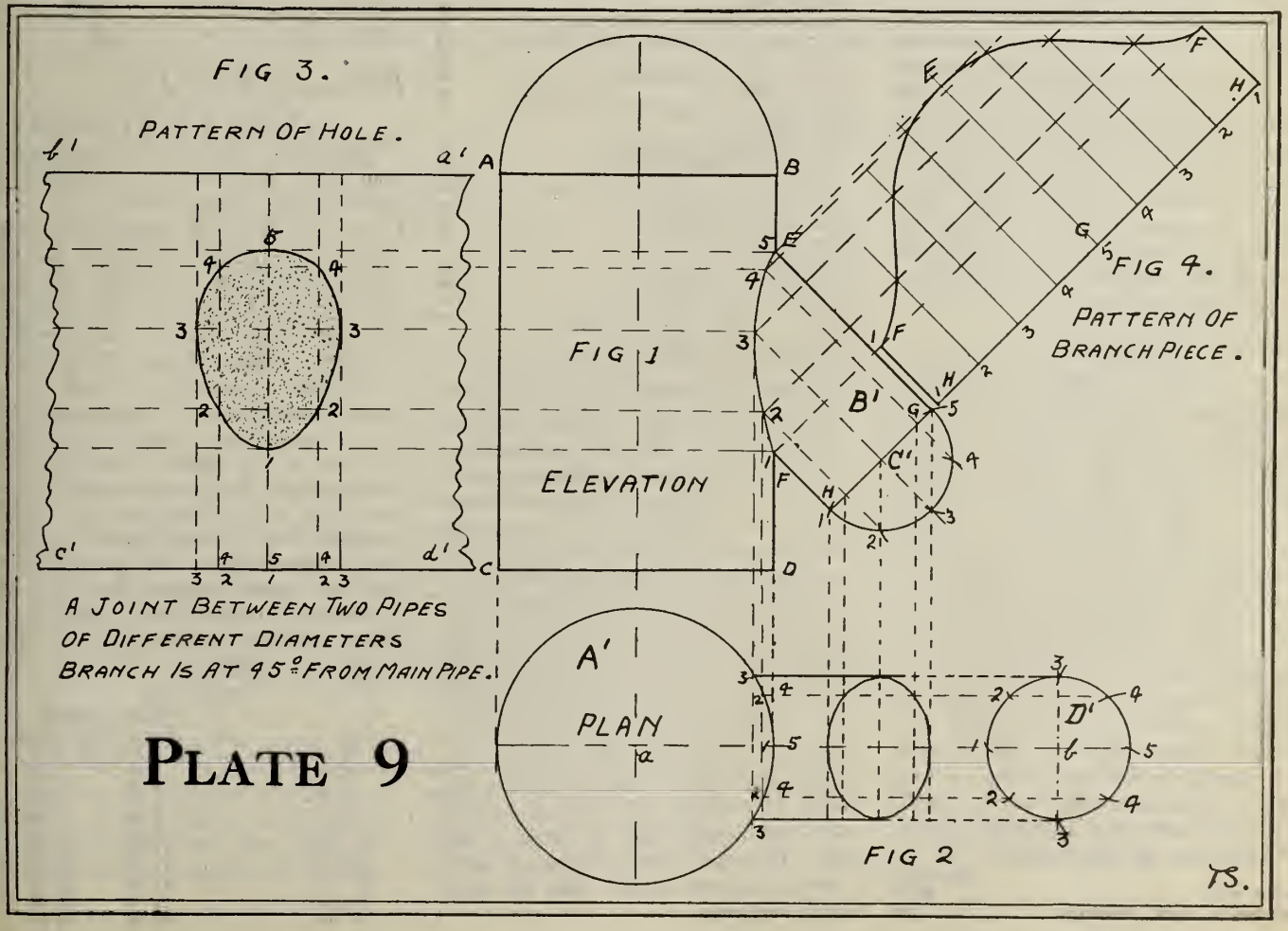
To develop the pattern of the small pipe extend a stretchout line as shown from G C^1 and transfer the measurements described on plan D^1 to stretchout line H G H.

Now erect a number of lines at right angle from these points, then draw a number of lines from points on mitre line F 1, 2, 3, to E intersecting all the lines previously drawn at right angles with stretched line Fig. 4.

Trace a solid line through these joints of intersection, and the pattern for small pipe is complete, except that allowance must be made for locks, seams or caps as the case may be.

To develop the shape of opening required in large pipe, extend lines A B and C D as shown in Fig. 1, thus describing a part of the stretchout necessary to develop the shape of the opening upon. Now draw 5 horizontal lines from points 5, 4, 3, 2, and 1 on the mitre line, parallel with lines a^1 b^1 c^1 d^1.

(Continued on page 30)



Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

MARKETS AT A GLANCE

With the high prices being paid for pig lead the market for lead products has advanced considerably. Lead pipe and waste pipe have gone up 2c per pound and lead traps and bends are now quoted 10 per cent. advance on list. Lead sheets have also advanced 2c per pound. There has been an advance of 5 per cent. on valves of various kinds. Range boilers have been moved up 50c for both standard and extra heavy. Wrought steel pipe has been increased $4 per ton and soldering coppers are quoted 2c per pound higher. There has been a movement upward in prices being paid for old materials. Malleable fittings have been advanced by the manufacturers and wholesalers are expected to follow up in the near future. Business in enamelware is reported much better for the opening weeks of the present year as compared with last year. Manufacturers are handicapped greatly through the embargoes on steel and iron and coke.

TORONTO. Feb. 27.—Wholesalers report that business in enamelware lines has been fairly good, the heaviest trade coming from the good-sized centres outside of Toronto. One firm reports that their business for January was double what it was in the same month in 1916. February gives promise also of being a good month. There is a firmness in the market for all supplies connected with the plumbing trade, and higher prices are recorded in a number of lines this week. The greatest difficulty with foundries where some of the lines are manufactured is the securing of coke, steel, and iron from the sources of production. Some ray of hope was given through the announcement during the first part of the week that the embargoes from the Pittsburg district had been lifted.

Globe, Angle and Check Valves Up 5%

VALVES.—Another advance of approximately 5 per cent. has been made in the price of globe, angle and check valves, together with radiator valves. Globe, angle and check valves in the standard make that were formerly quoted at 25 per cent. discount off list, are now quoted at 21 per cent., while the high grade in the same valves are quoted at 16 per cent. off list, as compared with 20 per cent. formerly. There is a good demand for valves, manufacturers reporting that they are working the full capacity in their plants, the demand continuing particularly good on steam work for munition works and other industrial plants. Following are the discounts:—

	Per Cent.
Ground work	45-47
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2,	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	20
Globe, angle and check valves, standard	21
High grade	16
Radiator valves, standard	30
High grade	30
Patent quick opening valves	60
Basin Cocks—	
No. 0 & 1, Fuller pattern	53
No. 0 & 1, compression	49
Midget	51
Steam cocks, square nut	50
Steam cocks, iron body	45
Globe, angle and check valves, medium pressure	40
Radiator valves, standard	60
Radiator valves, Jenkins disc	60
Radiator valves, quick opening	60

Range Boilers Are Up; Enamelware Market Firm

RANGE BOILERS, ENAMELWARE.—An advance of 50c has been made in the price of the standard 30-gallon range boiler, the new quotation now being $10.50 each. For the extra heavy 30-gallon range boiler the price is now $13 each, as compared with $12.50 formerly. Enamelware is in firm market and business in bathtubs and sinks has been fairly good. The market for pig iron is high with a tendency to advance and it is anticipated if the situation continues there will be higher prices for cast-iron enamelware as a result. One firm reports their business during the month of January this year in enamelware was double that of January last year. February gives promise of being a better business month than the same month last year.

30-gallon range boilers, standard	$10.50
30-gallon range boilers, extra heavy	13.00
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	23.70
Bathtubs, 5½ ft.	27.30
Sinks, roll-top, 18 x 30 in., staple	12.15

Lead Products Have All Been Moved Up

LEAD AND ZINC PRODUCTS.—Following the firmness in the primary market for pig lead there has been a general movement upward in the price of all lead products. Lead pipe and lead waste pipe have been advanced 2c per pound. Lead traps and bends are now quoted 10 per cent. advance on list as compared with net list previously. Lead wool has increased 2c per pound and lead sheets have advanced 1c per pound. Following are the quotations:—

Lead pipe, lb.	$ 0 16	....
Lead waste pipe, lb.	0 17	....
Lead traps and bends	10% on list	
Lead wool, lb.	0 15	....
Lead sheets, 3½ lbs. sq. ft.	0 15¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 15¼	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 34	....
Solder, strictly, lb.	0 32¼	0 38
Solder, commercial, lb.	0 31¾	0 35
Solder, wiping, lb.	0 31½	0 32
Solder, wire, lb.	0 35	....
Zinc sheets, per lb.	0 25	....

Wrought Steel Pipe Goes Up $4 Per Ton

WROUGHT PIPE.—An advance has been made effective in the price of wrought steel pipe which amounts to $4 per ton for both lapweld and buttweld. The increase amounts to two points on all sizes. Demand for pipe has been good and manufacturers are kept busy in the face of the difficulties attached to manufacture. The volume of business is hardly as large as in normal years but the difficulties attached to manufacture have increased the activities of the makers. Conditions are not promising for the production of lapweld pipe in the sizes from two inches upward. For buttweld pipe the situation is improving so far as production goes and manufacturers look forward to have the situation fairly well in hand within the next few weeks. New net prices are as follows:—

Buttweld.

Size—	Net Per 100 Feet. Black	Galvanized
⅛ in.	$ 4 50	$ 6 00
¼ in.	3 66	5 79
⅜ in.	3 66	5 79
½ in.	4 76	6 33
¾ in.	5 87	7 99
1 in.	8 67	11 82
1¼ in.	11 73	15 99
1½ in.	14 03	19 11
2 in.	18 87	25 72
2½ in.	29 84	40 66
3 in.	39 02	53 17

3½ in.	48 76	65 78
4 in.	57 77	77 94
Lapweld.		
2 in.	21 83	28 31
2½ in.	32 76	43 00
3 in.	42 84	56 23
3½ in.	53 36	70 38
4 in.	63 22	83 39
4½ in.	73 66	97 16
5 in.	85 84	113 20
6 in.	111 40	146 90
7 in.	147 60	191 60
8 in. L.	155 00	201 30
8 in.	178 60	221 80
9 in.	213 90	277 70
10 in. L.	198 40	257 60
10 in.	255 40	331 70

Prices Ontario, Quebec and Maritime Provinces.

Soldering Coppers Advance 2c Pound

SOLDERING COPPERS.—In sympathy with the high market prices for copper, soldering irons have been advanced 2c per pound, and are now quoted at 63c per pound base, the former base price being 61c. In the ingot form copper is now being quoted at 38c per pound and there is a shortage of the material. During the week old scrap copper advanced as much as 2½c per pound. The market for all copper products is one of firmness.

Higher Prices Paid For Old Materials

OLD MATERIALS.—There was a generally upward tendency in the prices being paid for old materials. Tea lead advanced ¼c per pound, heavy lead pipe went up ¾c, yellow brass advanced 1¼c, red brass increased 1½c, heavy copper took a jump of 2½c and stove plate was quoted at $1.50 per ton. Old automobile tires advanced ¼c per pound and bicycle tires 1c per pound. Dealers anticipate prices will go higher so long as there is no word of peace but expect the market to break sharply as soon as there is the first ray of light in the black welter of war. Following are the prices being paid by dealers:—

	Per lb.	
Tea lead	$ 0 06¼	.....
Heavy lead pipe	0 08¾	.....
Yellow brass	0 17	.....
Red brass	0 21	.....
Heavy zinc	0 09½	.....
Heavy copper	0 28	.....

Malleable Fittings Due for an Advance

SOIL PIPE, FITTINGS.—Manufacturers have advised dealers that the price of malleable fittings have been advanced from 10 to 15 per cent. Wholesalers have not yet moved their quotations higher but it is highly probable they will in the near future. The discount on malleable fittings is now 15 per cent. off list and will probably be selling net list in the not distant future. The situation in soil pipe continues to be one of great firmness owing to the difficulty manufacturers are experiencing in getting the supplies of raw materials and coke. Shipments have been held up through embargoes and this has made manufacturers reluctant to give quotations on goods they were not sure they could deliver. There is a firm and advancing market in pig iron, which taken together with the coke situation, has led some dealers to look for higher prices in the near future. Demand for soil pipe at present is somewhat light, except where it is being used in munition plants. Following are the discounts:—

	Discount
Medium and extra heavy soil pipe, 6-inch and under	55%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	60%
Malleable fittings	15%
Cast iron fittings	45%

Oakum Quotations Firmly Maintained

OAKUM.—Dealers anticipate the local market for oakum will likely be higher in conformity with the higher prices that are being paid in the United States. There is a scarcity of dyeing materials and other raw materials. Demand at the present time is somewhat light and this is acting as a steadying factor. With the development of a heavier demand in the spring it is expected that prices may be moved upward.

	Per 100 Lbs.	
Plumbers' spun	$ 8.00	$ 8.50
Best American	20.75	21.00
U.S. Navy (American)	20.00	20.35
Clipper U.S.	28.00	.....
U.S. Navy (English)	16.50	.....

Pig-Iron Shortage Affecting Steel Mills

PIG IRON.—There is no improvement in the pig iron situation, and the market is upset. The coke shortage in the U. S. due to lack of cars and motive power has resulted in many furnaces being banked. There is therefore a shortage of pig iron which is seriously affecting the steel mills. Foundries are also severely handicapped and in some cases have practically closed down. Canadian foundry pig iron continues off the market owing to the shortage of coke and no prices are being quoted. The situation as it affects cast iron enamelware therefore remains unchanged.

Submarine Situation Affecting Ingot Metals

The international situation continues to affect the metal markets and is tending to make prices firmer in anticipation of increased demand. The submarine situation is also affecting the markets, but not to any material extent as the opinion is generally held that the submarine operations will not interfere with shipments of metals to an extent sufficient to cause any serious delay or loss of cargoes.

COPPER.—Quotations on copper continue nominal, there being very little spot metal for sale to form a basis for prices. Copper is unchanged locally at 38 cents per pound.

TIN.—The market is easier due to arrivals in New York of large amounts of tin, and prices are a shade lower. Tin has declined 2 cents locally, but is entirely nominal at 50 cents per pound.

SPELTER.—The market is quiet and unchanged, but there is a firm undertone. Local price unchanged at 13½c per pound.

LEAD.—A tight situation has developed in the market due to the scarcity of lead as a result of the freight congestion. The "Trust" is still quoting 8.50c, but independents have jumped the price up to 10c and 10.25c, New York, for spot metal. Lead has advanced 1¼c locally, and is now quoted at 12¼c per pound.

ANTIMONY.—The market is firmer, but quotations are unchanged in the meantime. Local price 35c per pound.

ALUMINUM.—The market continues firm and unchanged at 68c per pound.

CHARGING INTEREST ON ACCOUNTS

(Continued from page 22.)

the yearly rate or percentage of interest to which such other rate or percentage is equivalent."

I wish to particularly warn merchants from collecting interest, upon the assumption that they have the right so to do, because they have such notices printed on their invoices. The rate of interest sought to be charged must be stated at so much per centum per annum, not 1% per month. If the merchant collects 1% per month interest from any customer, then the customer has a right action against the merchant, for section 5 of the Interest Act, provided: "If any sum is paid on account of any interest not chargeable, payable or recoverable under the last preceding section, such sum may be recovered or deducted from any principal or interest payable under such contract."

My answer to the above question is, that a merchant may collect any rate of interest on overdue accounts, which the customer has agreed to pay, provided that the rate of interest is so much per centum per annum; and in case where no rate of interest has been agreed upon, then the merchant is entitled to collect 5% per annum on overdue accounts, from the time when they ought to have been paid until the time when they actually are paid.



PLUMBING INSPECTOR FOR ST. MARY'S, ONT.

There is another move on foot to appoint a practical plumbing inspector for St. Mary's, Ontario. It is to be hoped that such an appointment will soon be made, which no doubt will prove advantageous to all concerned, the public as well as sanitary engineers.

ACTION IN GALT

The city authorities of Galt are taking action these days by enforcing the law regarding installing sanitary fixtures in buildings on which sewers are laid. One case came up recently before the magistrate and a week was given the sanitary engineer to make a start on the work. The reason for the delay was given as shortage of labor. No doubt this is a reasonable excuse these days, as labor is certainly scarce, at least in Ontario.

WINDSOR REAPPOINTS INSPECTOR MEADOWS

Henry Meadows, who has been enjoying a "vacation" since last spring, when the special committee revised civic salaries, incidentally clipping him off the payroll, was reappointed plumbing inspector by the City Council recently.

At the suggestion of the Board of Health, William Wheeler, who had been doing the work as plumbing inspector since Meadows took his "rest," was relieved of these extra duties in order that he might devote his whole time to the position of sanitary officer.

FIRES FOLLOW EFFORTS TO THAW OUT PIPES

Stratford, Ontario, has been experiencing a number of fires recently caused by people thawing out water pipes. The firemen made a quick response, and on arriving found the fires either under control or out. The fires were started by a torch used in thawing out water pipes, igniting some rags.

KEEP HOUSES HABITABLE

The Court of Revision, Toronto, recently refused to grant a refund of taxes to Mr. L. Pollock, 229 University Avenue, in regard to a vacant house on Bellevue Avenue, Toronto. The Health Department reported the premises were unfit for habitation, as there was no water supply or proper drainage. On the chairman consulting the statutes, it was discovered that it was expressly stated that no allowance or refund in regard to taxes on premises that were vacant could be made unless such premises were in a habitable condition. This was confirmed by the City Solicitor, who said the clause had been incorporated in the city by-law governing vacancy allowances.

AN OLD PLUMBING REGULATION.

In 1365 King Edward III. of England signed a Plumbing Ordinance conferring privileges and legislating for the protection of the mutual interests of both the Public and the Craft. It was as follows:—"That no one of the Trade of Plumbers shall meddle with works touching the trade except by assent of the best and most skilled men in the said trade; testifying that he knows how, well and lawful to do his work so that the said trade shall not be scandalized or the community damaged and deceived by folks who do not know their trade."

It will be seen by the above that in the year 1365, tampering with plumbing work was deemed a serious matter. That none but practical men were allowed to do work of so important a nature. Yet in these days of enlightenment such is not the case to a certain degree. Things are, however, looking more favorable, and when none but expert sanitary and heating engineers are allowed to do work of this kind, the public will not be slow to give credit where credit is due.

PREMISES ENLARGED

In reference to the Cadillac Plumbing and Heating Company which has recently enlarged its premises, the Cadillac "Evening Post" says: "Mr. L. J. Deming, superintendent of the company, has been instrumental in building up a business that makes necessary very largely increased work room and display space." Mr. Deming is a former Simcoe boy, who learned his trade with the late J. D. Murdoch.

OPPOSED TO SEWER VENTILATORS

Works Commissioner Harris has reported to the Board of Control, Toronto, against the suggestion from Controller Foster that ventilation shafts be provided for sewers and that the existing manholes be sealed up. The commissioner states that the ventilation shafts would be unsightly and would be opposed by the citizens, and that the sewer gases would collect near the manholes and constitute a danger.

It is rather strange that Commissioner Harris could not have answered the question when it was first mooted by Controller Foster, some time ago.

CITY WILL INSTAL 200 WATER METERS

Water meters will be installed throughout the City of Merritt, B.C., for the purpose of providing a better service and at the same time protecting the water system against unnecessary drains and leaks. This question came up for consideration at the council meeting a short time ago, when the report of the water and light committee was received and a lengthy discussion, in which every member took a part, followed.

The water and light committee, authorized at a previous meeting to investigate the loss of 5,000,000 gallons of water during the year 1916, brought to the attention of the council by the city engineer's report, informed the council that the system cost the city $4,887.95 more than the revenue it produced during the past year. This was a staggering statement, but was easily proven, and the committee recommended that the city should install meters and make a meter charge for water, instead of a flat rate, as now exists.

From information presented to the council by the water and light committee, of which Ald. Boyd is chairman, it was determined that the probable cost of installing meters for every water consumer would aggregate in the neighborhood of $2,000.

BAD PLUMBING WORK DONE

Plea for Practical Plumbing Inspector in Kingston, Ontario

In urging upon the Board of Works, at a meeting held recently, the necessity of appointing a practical plumbing inspector for Kingston, William T. Guild, a member of the Trades and Labor Council, charged that scarcely a plumbing job was done in Kingston that conformed to the city by-laws. In fact, Mr. Guild, who is a first-class plumber himself, declared that the plumbing in very few houses is installed as it should be. As the result of inefficient plumbing and lack of proper inspection, there was much trouble, and the health of the occupants of houses was endangered by the escape of sewer gas. Competition was given by Mr. Guild as the chief reason for poor plumbing being done. The city engineering department has not sufficient staff to make a proper inspection, and the result is that plumbers will "get away with" a lot of things that would not be tolerated under careful inspection.

The statements of Mr. Guild were quite a surprise to the Board of Works members, who had no idea that conditions were so bad as that, but the labor representative declared that he could prove everything he said and named several places where very faulty plumbing had been installed. The fault did not lie with the plumbers, who simply carried out orders.

Ald. Litton asked Mr. Guild if the Plumbers' Union was not a strong enough body to take action in the matter and force their employers to have plumbing work done properly. In reply, Mr. Guild said that the union might, but it was a case of keen competition, and a good employee generally did what he was told.

Harold Lane, who is also a plumber, gave some of his experiences and said that during his fifteen years at plumbing not one water test had been made on a job in this city. The smoke test was only a minor one, and stated that Kingston was very badly in need of a practical plumbing inspector who would see that the by-laws of the city were carried out and that the health of the people was protected.

Ernest Cain, president of the Trades and Labor Council, asked the Board of Works to give careful consideration to the matter. The Board of Health had recommended the appointment of an inspector, and the matter was now in the hands of the Board of Works.

It was suggested that a plumbing inspector could be paid largely by fees, and that he could also serve the Utilities Commission by reporting leaky water taps.

On motion of Ald. Nickle, the City Clerk was instructed to secure information from various cities as to their plumbing inspection.

WATER POWERS OF MANITOBA, SASKATCHEWAN AND ALBERTA

"Water Powers of Manitoba, Saskatchewan and Alberta," a well-bound and attractively illustrated volume just issued by the Commission of Conservation, forms a valuable contribution to the authentic literature respecting the natural resources of Western Canada. This report, by Leo G. Denis and J. B. Challies, comprises the results of special surveys by the Commission of Conservation and a compilation of records from other reliable sources. As a compendium of all available data on the subject, it is particularly valuable for reference purposes.

While the Prairie Provinces, as a whole, are not lavishly endowed with water powers, the report demonstrates that the utility of their rivers for power development can be vastly enhanced through proper storage of flood waters. At present, in the absence of conservation dams, and of adequate natural regulation, the great volume of flow is lost during higher water seasons. Methods of development to ensure the maximum utilization are now being carefully worked out on the Winnipeg, Bow and other large rivers. The more northerly regions possess numerous sites of great potential value for pulp, electro-chemical and other special industries.

The report just issued is the second in the series on water powers in Canada to be published by the Commission of Conservation. The third volume, "Water Powers of British Columbia," which is now in press, will complete the Commission's general inventory of this item of the Dominion's natural wealth.

ALUMINUM AS AN ANTI-INCRUSTANT

In a communication to the Academie des Sciences, I. Pouget reports that aluminum, in the state of powder or paint, prevents the deposition of incrustation ("fur") on the inner walls of boilers. Experiments were made with a water-bath, the feed-pipe of which was gradually choked by the lime salts deposited by tap water, this treatment reducing the deposit to one-third in a fortnight in the case of aluminum powder, whilst with the paint the bath remained in use for three years without having to be cleaned out.

WOULDN'T YOU?

I would rather be a lighthouse on life's ocean,
Than a costly marble shaft upon a mound;
Be a guiding unit through the billows,
Than praise the smouldering clay beneath the ground.

I would rather have a bunch of meadow daisies
Given me, for succor I have shown,
Than choicest wreaths, adorned with gauzy ribbon,
Decked around my bier when life has flown.

I would rather eat a crust with easy conscience,
Knowing it was earned by honest toil,
Than feast on all the dainties nature offers,
If gaining them made hearts a lawful spoil.

I would rather see a fellow being happy
By some loving deed of kindness I had done,
Than whisper words of praise to ears unheeding,
When the crunching, plumed carriage passes on.

I would rather be a has-been, worn and battered,
If my scars were won in striving for the right,
Than a Never-was who drifted with the current
Because he lacked the grit to stand and fight.

I would rather be the Lighthouse, than the Tombstone,
A Beacon pointing out the goal in view,
Helping storm-wrecked souls to reach the Haven.
I would rather be the lighthouse. Wouldn't you?

—Eva E. Hamilton.

"JUST SO"

Technical training will abolish the present system of apprenticeship in many establishments, viz., just letting a boy grow into the business because he happens to be on the premises.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHAT SIZE SEPTIC TANK?

Editor The Sanitary Engineer.

I am asked to instal four bathrooms in a country residence. There is no drainage system, and a septic tank is to be constructed.

There will never be more than eight persons residing in the house at one time, but for reasons I cannot explain four complete outfits are to be equipped, viz., four baths, four lavatories and four w.c.'s. There will be just an ordinary kitchen and range boiler, etc.

Now, can you tell me what sized septic tank I will have to build, and also the quantity of tile pipe I must use. I would like to know how you would advise me to figure the job up, and if there is a rule that can be followed in every ordinary case, I would like to know. I propose using a 3-inch Stevenson & Malcolm syphon.

I might say that an electric pneumatic water pumping system will be used to supply water to the plumbing fixtures. An early reply will oblige.

B. O., Ontario.

Replying to the above question, it is not always the number of bathrooms or fixtures that govern the size of a septic tank or sewage disposal system, though it may appear to an outsider that four bathrooms would require a larger system than one bathroom.

It is the number of persons that are to reside in the house that must be the basis upon which the size and number of pipes required must be determined.

To each person an allowance of 15 to 20 gallons (in this case we would advise 20 gallons) of water per day, which is equal to 160 gallons. This is the quantity of fluid that must be flushed every 24 hours from the dosing chamber, or the chamber that contains the syphon.

This is equal to about 23 cubic feet, and is determined by allowing 7 gallons to the foot. If a 3-inch syphon is to be used it will be found that the height of the fluid, or rather the depth before flushing, will be about 14 inches, 1 1/6 feet. The distance between the bottom of the tank and the syphon is 2 inches; 16 inches from bottom of tank to high water level. If 23 cubic feet is required, then the dosing or syphon chamber should be about 28 inches deep, 4 feet wide, and 4½ feet long. This will allow one foot above the high water line, and by making the tank as stated it will give practically 18 times 1-16, or approximately 23 cubic feet depth of sewage to be discharged.

Regarding the quantity of pipe to be used, the amount of glazed tile pipe with hubs depends upon the layout of the system. If the absorption bed is long and short laterals are laid for the absorption bed, then the glazed tile do not count, and the joints must be made with oakum and cement. The field tile is laid about one quarter of an inch apart, open joints, and nearly level, as also is the trunk line of glazed tile. The distances between the laterals should not be less than 3 feet, according to the nature of the soil, and about 14 inches below the surface of the ground, not more.

The quantity of field tile is arrived at in the following manner:—To every cubic foot of sewage to be discharged at one time allow 13 lineal feet of 4-inch field tile pipe, and place about 6 cubic inches of broken stone or cinders at each open end. Also place over each open joint either a few broken stones, cinders, or a piece of broken tile pipe, anything that will prevent the earth washing into the pipe.

If the ground is inclined to be clayey, a more liberal quantity of coke, cinders, broken or coarse gravel may be filled round the absorption pipe.

Another important matter must not be overlooked: that of priming the syphon before placing on the bell. If this is not done, there is no water in the bend of the syphon, and no air will be confined in the long leg and bell, which really is the cause of syphonic action being set up.

Further, it will be found that for some weeks after a septic tank has been in operationu that a slight odor will be detected. This is very common, and the cause is that the new sewage has not had sufficient time to allow the cultivation of the bacteria.

If there is a septic tank in the neighborhood, and some of the fluid from the receiving chamber can be procured and dumped into the receiving chamber of the new tank, it will assist the germs to develop in a shorter period.

Always instruct the occupants never to use carbolic soap or other antiseptic soaps or fluids in such a way as to allow these chemicals to enter the septic tank, as these antiseptic chemicals will destroy the "septic" principles of the tank. Antiseptic is the opposite to septic. This is very important.—Editor.

PRACTICAL SANITARY ENGINEERING

(Continued from page 16)

pipe at top of syphon B in Fig. 1, it will act in just the same way as if the pipe is filled with water. Now turn to Fig. 2, which shows a bent pipe, one side shorter than the other, and both ends submerged in water. First fill both legs with water, holding the fingers over the two ends; then submerge the ends into the water, and it will be found that vessel A will soon be emptied. Here is the explanation: Air, atmospheric pressure 14.7 will hold up a column of water 34 feet high, if the water is confined in a tube and closed at the top, in just the same way as the schoolboy will take a glass tube, fill it with water, hold his finger over the top end, etc., etc. Therefore, in Fig. 2, there is the same atmospheric pressure on water in vessel A as there is on B, or very nearly so. But the atmospheric pressure on B has to hold up a longer column of water than has

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of symmetrical design and proportion.
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Made regularly with flat spout 3½ inches from centre of cock body to centre of spout opening; furnished 2¾ inches centre to centre to specification only.

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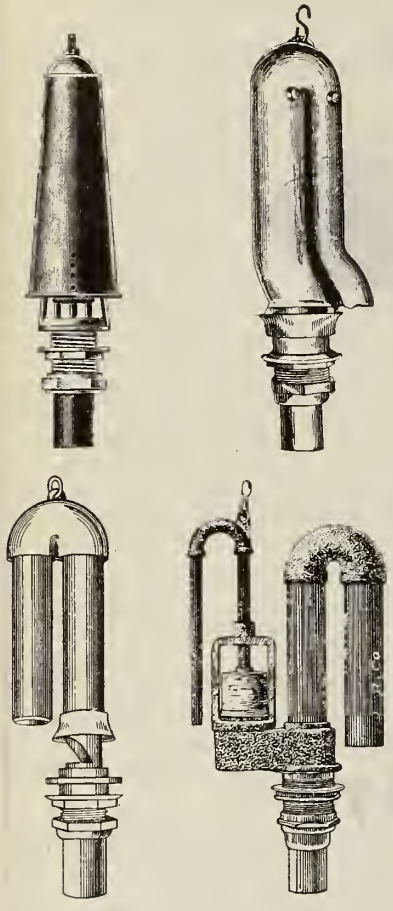
SARNIA, ONTARIO

Makers of Fully Warranted Water, Plumbing and Gas Brass Goods.

the pressure which is on vessel A. Therefore, the water overflows; this would not be the case if both legs were the same length. That is the explanation why water always finds its own level, providing there is no air pocket or chamber to be overcome. These thoughts will be of value to the reader as time goes on, in proving the why and wherefore of vents, revents, traps, etc.

Syphons can be used in many ways by sanitary engineers, particularly in water supply systems.

For instance, where an elevated tank is in use, and for some reason or other it is not advisable to bore a hole in the bottom of the tank (see Fig. 3). The pump discharge pipe can be used as shown, which will act as a syphon when



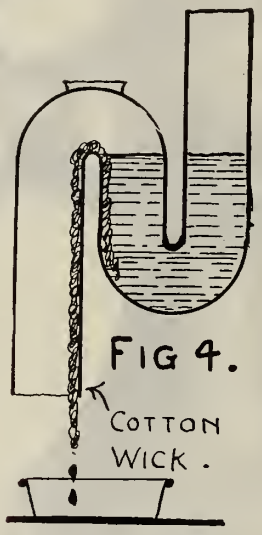
Various types of Syphons used in w.c. tanks.

a tap is opened sufficiently low. Syphons are also used now very generally in connection with sewage disposal systems and intermittent flushing of sewers and drains. Syphons are used, too, on range w.c.'s for intermittent flushing purposes. No drug store or chemical works would be complete without one or more syphons. For these latter industries syphons are made of either glass, porcelain or lead.

Many types of w.c. tanks are fitted with as many kind of syphons, though the principle upon which these latter syphons are built is the same. Syphons used in septic tanks will be described under heading of sewage disposal systems.

Capillary Motion

Now let us consider for a while the problem of capillary motion. What is capillary motion? Or how does it affect the plumbing trade, and why are we interested in it? If our readers have noted an empty trap attached to a fixture and examined it very carefully, they would find that the water had disappeared either by evaporation or by capillary motion. For an example, take a regular round drawn lead trap, turn it upside down, take out the trap screw and fill the trap till it is sealed. Then take a strand of cotton wick, wet it, and place one end into the water, allowing the other end to hang over the weir of the trap; place a vessel under the lower end of the trap and note the water empty



Capillary motion will draw the water out of the trap.

out over the weir (see Fig. 4). If the wick is sufficiently long as shown, it will be possible to empty all the water out of the trap.

Centrifugal Motion

The term as applied to traps is not meant to have any relationship with centrifugal pumps, because the former is simply a spiral motion of water which is set up in various styles of traps, viz., centrifugal traps and round drawn traps.

To a certain extent the latter kind is responsible for a lot of trap venting which is not necessary in many other types of waste traps, which have a deep seal and are of the self-cleansing type.

At the same time, it is very doubtful if there exists a trap that can not be syphoned, or its seal broken under certain conditions. Some of these conditions will be dealt with in articles to follow in future issues.

(Continued in next issue.)

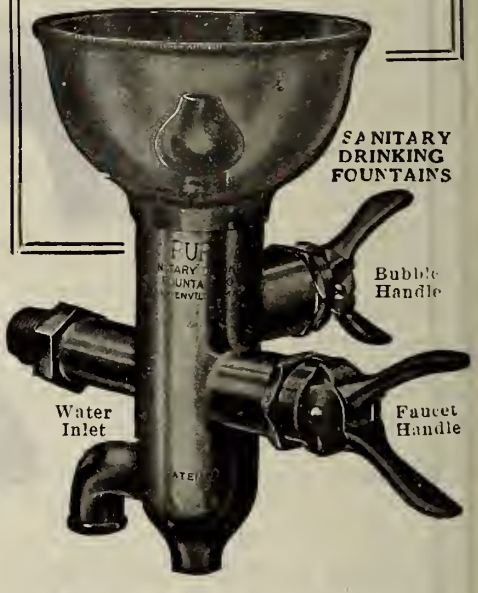
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Puro Sanitary Drinking Fountain Company
147 University Ave., Toronto, Canada

PRACTICAL SHEET METAL WORK

(Continued from page 23)

Next transfer the measurements of the various intersections described in plan A^1 Fig. 2 on to the line c^1 d^1 as shown at 3 4/2 5/1 4/2 3, taking great care to transfer them accurately, on account of their being slightly different.

Now erect perpendicular lines from the measurements transferred intersecting the horizontal lines previously drawn from mitre line in Fig. 1.

By tracing a line through points intersected the pattern of the opening described by shaded part is complete.

(Continued in Next Issue)

J.M.T.

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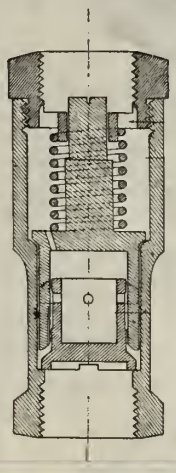
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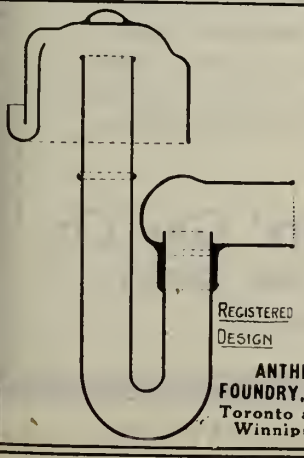


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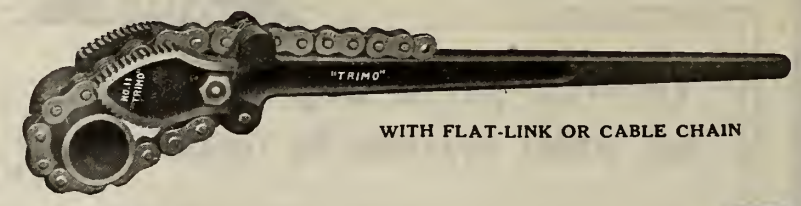
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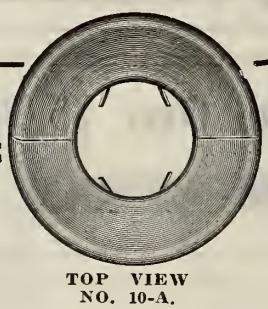
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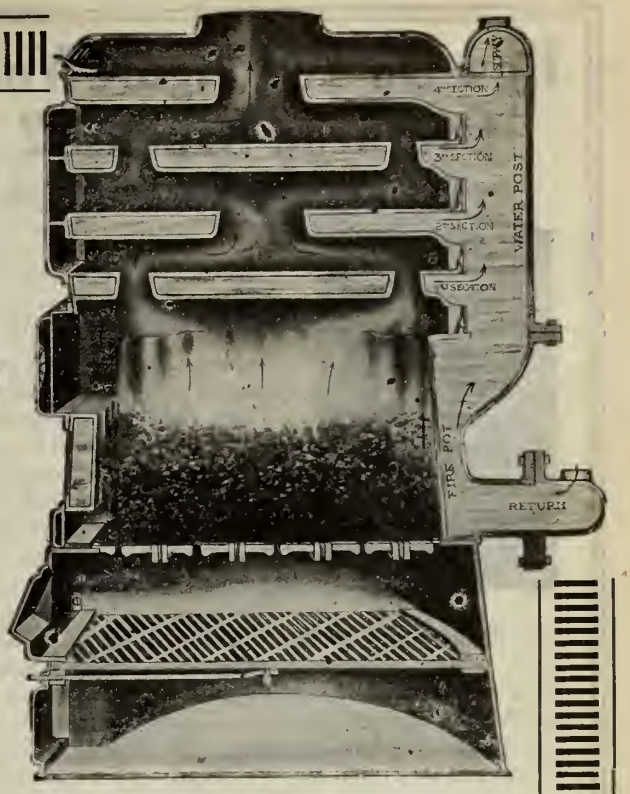
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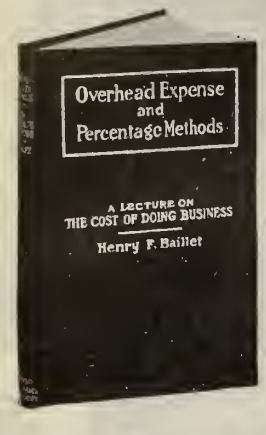
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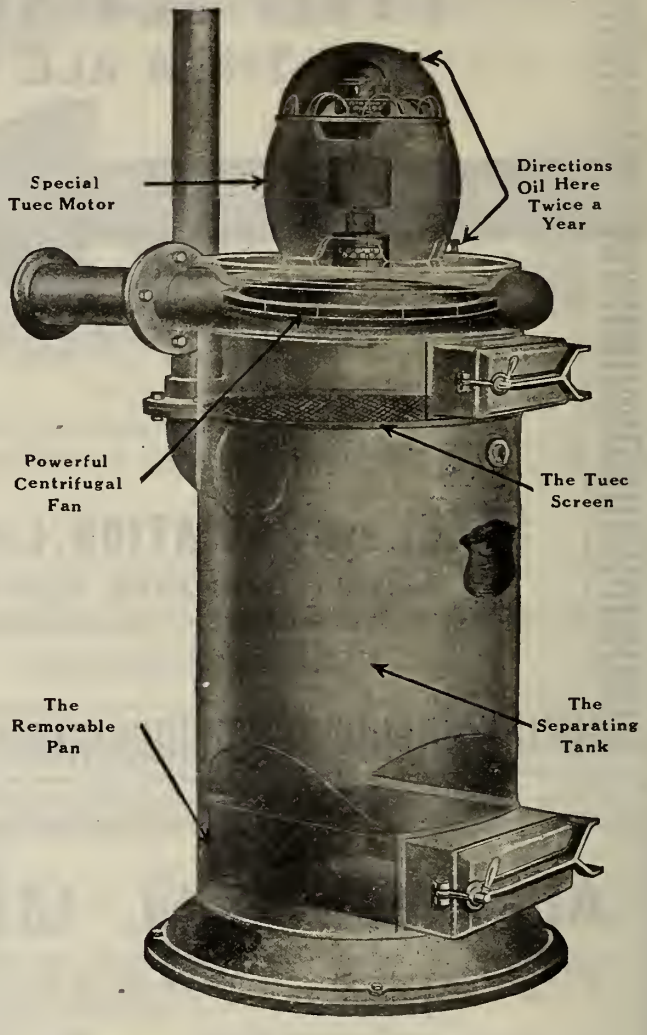
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Puro Sanitary Drinking Fountain Co., Toronto.
Wallaceburg Brass Mfg. Co., Wallacehurg, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Brass Pipe and Tube.
B. O. T. Manufacturing Co., Toronto.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Empire Mfg. Co., Ltd., London, Ont.
Canada Metal Co., Ltd., Toronto.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Drainers.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxhury, Mass.

Closets.
Empire Mfg. Co., Ltd., Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.

Country Residence Equipments.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Damper Regulators.
W. E. Clark Co., Ltd., Toronto.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Ejectors, Steam.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

Ejectors for Sewage.
Darling Bros., Ltd., Montreal.
National Equipment Co., Ltd., Toronto.

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Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

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Empire Mfg. Co., Ltd., London, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Fittings.
Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

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Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

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Beaton & Cadwell Mfg. Co., New Britain, Conn., U.S.A.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.
Beaton & Corbin Mfg. Co., Southington, Conn.

Gasoline Engines.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Gas Water Heaters.
Galt Brass Co., Ltd., Galt.
Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Generators.
W. E. Clark & Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Heaters.
Darling Bros., Ltd., Montreal.
Lord & Burnham Co., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Canada Metal Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Speakman Supply & Pipe Co., Wilmington, Del.

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Trimont Mfg. Co., Roxhury, Mass.

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National Equipment Co., Ltd., Toronto.

Packing.
Canadian Wolverine Co., Ltd., Chatham.

Packless Radiator Valves.
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Kerr Engine Works, Walkerville.

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Beaton & Corbin Mfg. Co., Southington, Conn.

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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

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Trimont Mfg. Co., Roxbury, Mass.

Pipe Joint Compounds.
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James Morrison Brass Mfg. Co., Ltd., Toronto.

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Anthes Foundry Co., Toronto and Winnipeg.
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James Morrison Brass Mfg. Co., Ltd., Toronto.
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Warden King, Ltd., Montreal.

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A. R. Jardine & Co., Hespeler.

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Trimont Mfg. Co., Roxbury, Mass.

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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Radiator Foot Rests.
Beaton & Cadwell Mfg. Co., New Britain, Conn., U.S.A.

Radiator Traps (Steam).
W. E. Clark & Co., Ltd., Toronto.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

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Canada Metal Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
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Septic Tank Valves and Syphons.
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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Darling Bros., Ltd., Montreal.
Dart Union Co., Ltd., Toronto.
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Darliug Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.

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James Morrison Brass Mfg. Co., Ltd., Toronto.

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W. E. Clark & Co., Ltd., Toronto.

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Nicholson File Co., Port Hope, Ont.
Williams, J. H., & Co., Brooklyn, N.Y.

Unions.
Canada Metal Co., Ltd., Toronto.
Dart Union Co., Ltd., Toronto.

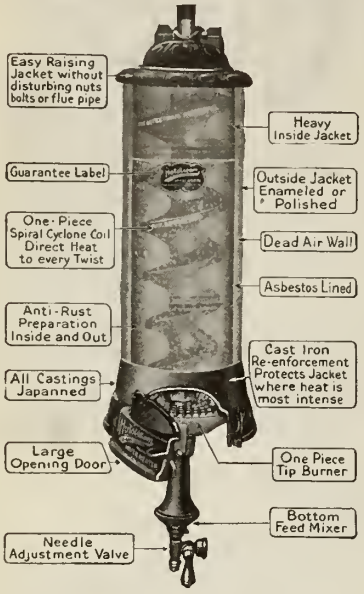
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Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
W. E. Clark & Co., Ltd., Toronto.

Vitro Tanks.
Cluff Mfg. Co., Toronto.

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W. E. Clark & Co., Ltd., Toronto.
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Quality Survives



Service—Speed—Economy

If your jobber can't supply you—write direct

THE HOTSTREAM HEATER CO.
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W. H. Cunningham, 99 Kingswood Rd., Toronto, Canadian Representative.

Isn't it a fact that YOU can buy "Water Heaters" at any old price? But did you ever stop to realize that your CUSTOMER buys the SERVICES of the heater—not the heater itself? Even if he THINKS he wants the cheapest heater made, he EXPECTS GOOD SERVICE, and if he doesn't get it he BLAMES YOU. He FORGETS his only saving is in first cost, yet DEMANDS that it meet with HIS idea of a Water Heater in SERVICE, SPEED and ECONOMY.

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Yet the price of a Hotstream is small compared to what its EXCELLENT SERVICES justify.

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—soon pays for itself

The Hall No. 2
Rapid Upright Roller
Pipe Cutter

MADE IN CANADA

Regular capacity ½ in. to 2 in., with extra cage will take ⅛ to ⅜ in. pipes. Cuts from 400 to 500 pieces of 1 in. pipe per hour.

IN A MEDIUM-SIZED SHOP IT WILL SAVE ENOUGH TIME AND PIPE TO EASILY PAY FOR ITSELF IN LESS THAN TWO YEARS, AND AFTER IT IS PAID FOR THE SAVINGS GO TO MAKE LARGER PROFIT.

WEIGHT, 700 LBS.

INVESTIGATE THOROUGHLY—**send for catalog and prices on all sizes, and let us put you in touch with users so that you will know how Hall ma... pleasing others.**

Delivery from stock. No delay.

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BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES
Black and Galvanized All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED
Montreal Works: Lachine, Can.


No. 7 Iron
3-8 in. to 3 in.

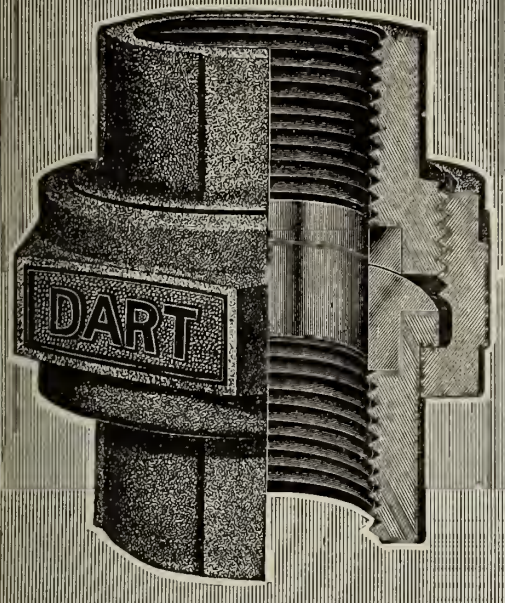
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The standard for years, and carried by the leading supply houses.
Insist on "B. & C." Plates.

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Canadian Representative:
W. H. Cunningham, 98 Kingswood Rd., Toronto, Canada


No. 10 Steel
3-8 in. to 4 in.

DART UNIONS



BRONZE TO BRONZE

Tight—permanently

Dart Union Pipe Couplings have Bronze to Bronze seats. No rust or corrosion in the vital part is possible.

And note the heavy iron parts—they will not stretch or pull apart.

The Ball-Shaped Joint permits easy and quick connecting, whether pipes are in or out of alignment—**it saves you time and bother.**
There is a shape and size of Dart Union to fit every need.

Your jobber sells them.

Dart Union Co., Limited
Toronto Ontario Canada

MADE IN CANADA

KERR GATE VALVES



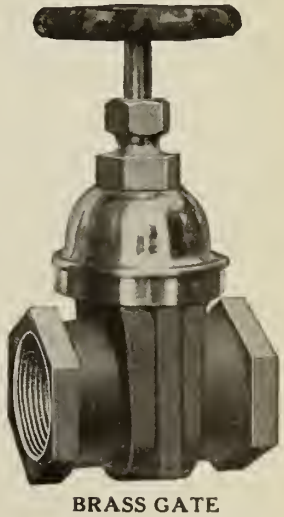
I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

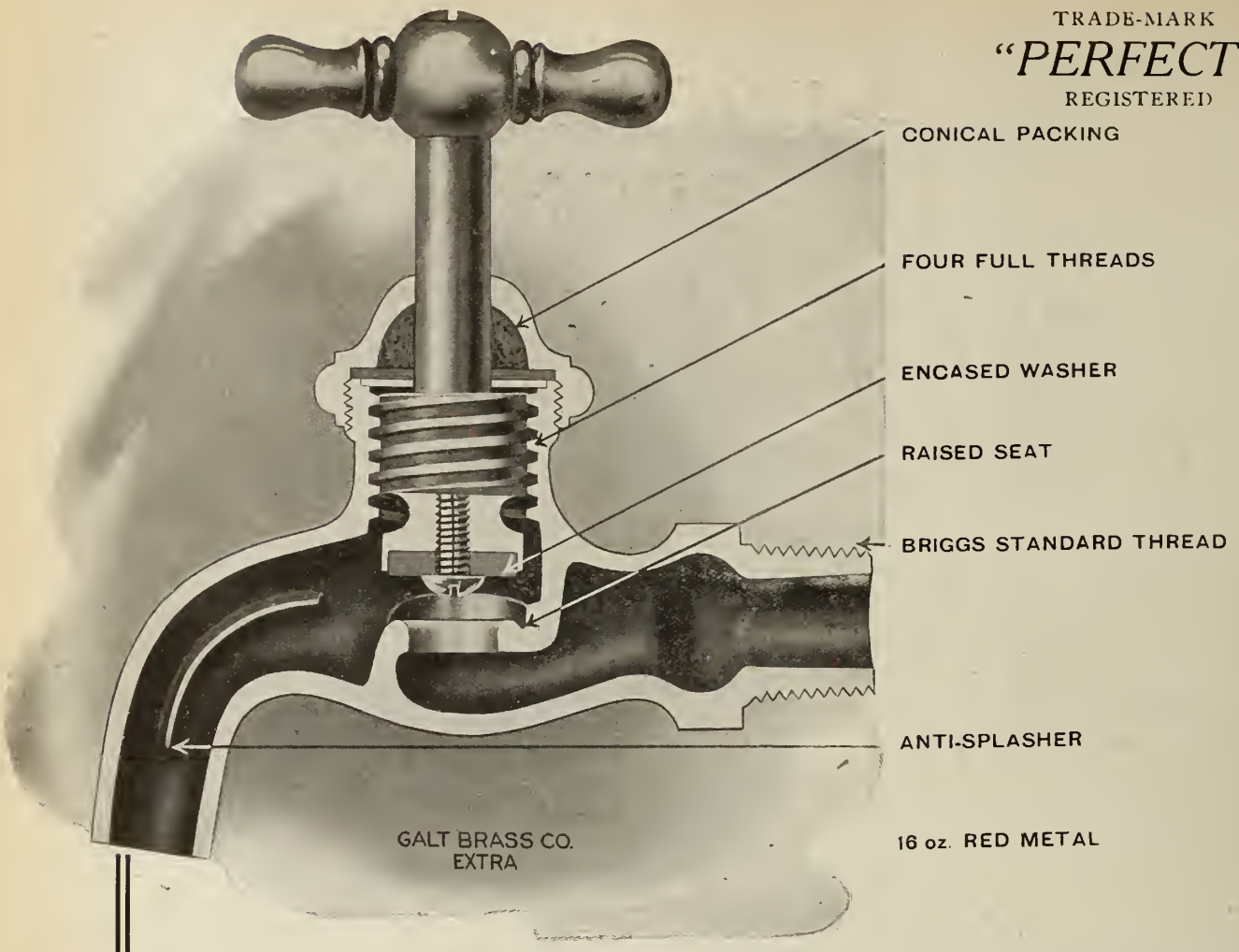
Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.



BRASS GATE

THE KERR ENGINE COMPANY, LIMITED
WALKERVILLE, ONTARIO

TRADE-MARK
"PERFECTO"
REGISTERED



The above illustration shows, in actual size, the exact construction of all our Bibbs.

They are all Quickopening, having Double Thread on stem.

The same features are also embodied in all our Bath, Basin and Sink Cocks.

GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

The Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, MARCH 15, 1917 | No. 6

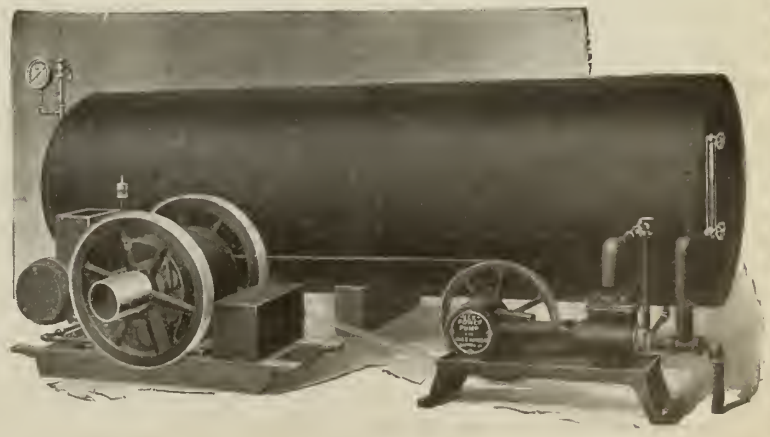
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EMPIRE HYDRO
Pneumatic Systems

Sanitary Engineers are finding that the selling and installing of Empire Hydro Pneumatic Water Supply Systems show excellent profits besides creating an opportunity for the selling of the necessary bath room fixtures.

There are all kinds of water supply systems to be installed in your neighborhood. Farmers want modern conveniences if they know how to get them, and we are spending money in the Farm Magazines to tell them about Hydro Pneumatic Systems. We are using our best efforts to bring the customer to you. Will you, Mr. Sanitary Engineer, do your part in selling the outfit? We carry in stock outfits to suit all requirements: Hand Pump, Electric or Gasoline Engine and Hydro Pneumatic Tanks of all sizes.



Write us for Pressure Tank System Catalogue.

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LIMITED
London Toronto

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

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DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Your constant effort to increase trade is by holding old customers and gaining new. To retain the old you must give them service and such goods that will please and satisfy. There must be no "come back" because of dissatisfaction.

That is why you can pin your faith to Dominion Rubber System products. Their qualities are of the kind that give absolute satisfaction. We stand back of our products with a warranty that they are free from imperfection in workmanship. That protects you and your customers, and ensures their good-will which is the best argument for your bigger business and increased profits.

For every Rubber need in Plumbing or Engineering, write our nearest branch.

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Branches at **Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, London, Kitchener, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Calgary, Edmonton, Vancouver, Victoria.**

ONE MAN DOES WORK OF TWO

WITH THE

"Jardine" and "Toledo" Pipe-Threading Tools



No. 11R

"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of "**JARDINE**" OR "**TOLEDO**" DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

WRITE FOR CATALOG OF COMPLETE INFORMATION.

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Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
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Sanitary Engineering of Buildings

BY

WM. PAUL GERHARD, C. E.

Consulting Engineer of Sanitary Works

Member Am. Public Health Association.
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103 Illustrations **6 Plates**

Deals with Defective Plumbing and Sewer Gas, Traps and Systems of Trapping, Drainage and Sewerage of Buildings, Plumbing Fixtures, Sewage Removal and Disposal, Improved Methods of House Drainage, Proper Arrangement of W.C. and Baths, Sanitation in Factories and Workshops, Sanitary Drainage of Tenement Houses, Testing House Drains and Plumbing Work, Simplified Plumbing Methods.

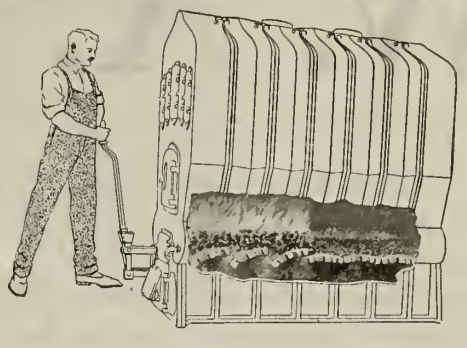
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TECHNICAL BOOK DEPARTMENT

MacLean Publishing Co., 143-153 University Ave., **Toronto**

Grates That Shake Half at a Time —How They Cut Down Coal Bills



EVERY square Burnham Boiler has its grate in two sections, each section operated by a separate shaker bar.

In the mild days of early fall and late spring, when some fire is needed, but when full fire would make things unbearably hot and stuffy, the man-who-owns-the-boiler can bank up the back half of his fire with ashes and run his fire on the front half. Instead of getting **more** heat than he needs and burning **more** coal than he needs to keep comfortable, he gets the gentle heat that he actually needs and burns only the coal that he actually needs to get it.

This economy-comfort point about the grates is a point that helps sell Burnhams. There are a number of other points that also help. And still others that help to **keep** the Burnham sold once it is sold. Our catalog points out these help-pointers. Send for it.

Lord & Burnham Co. Limited of Canada

(Boiler Department)

Royal Bank Bldg., TORONTO

Burnham Cosy Comfort Heat BB

Factory: ST. CATHARINES, ONT.

BRICK AND STONE DRILLS

HARDENED STEEL

9 Sizes

Making holes for

1/8-inch Iron Pipe to

2-inch Iron Pipe.



"C" Catalog

Page 148 Gives sizes, lists, etc.

Catalog "C" will be mailed to any Master Plumbers upon request.

For Handle—Use any Short Piece of Pipe

Internal Shoulder takes driving strain and saves the threads. These drills will make a clean, smooth hole without chipped edges through any wall, irrespective of its thickness.

Canadian Wolverine Company, Ltd., Mfrs. **Chatham, Ont.**

W. A. Fraser has come back

YOU remember W. A. Fraser, the brilliant Canadian author of "Mooswa," "Thoroughbreds," "Blood Lilies," and other good stories of India and Canada? Latterly Mr. Fraser's literary activity has been in repose, but now he has arranged to provide **MacLean's Magazine** with a brand new series of short stories, the first of which, "A WANDERING MUMMY," is a fine tale of the Canadian West, with an East Indian strand woven into it. It appears in the April **MacLean's.**

Canada is producing some very good short-story writers—new ones that is. We have Stringer, McFarlane, Sullivan, Leacock, Miss Laut, Roberts, Seton, Parker, O'Higgins, Patullo, L. M. Montgomery, et al, of international fame; and a new lot breaking into the greater light. One of these newer writers is

Hopkins Moorhouse, who is "coming strong." Mr. Moorhouse is a Manitoban, and to the April MacLean's he contributes The Centre of Gravity, "corking good stuff," to use the language of the Editor. This is the first of a series of stories featuring Andy Doolin, a "character," keeper of a saloon. These stories are of the boom days in British Columbia's gold mining history, days when Jim Crotty, Dutch McGee, and The Parson, desperadoes all, made life a catchy thing and stirring.

Mary Gaunt, a new contributor to MacLean's, has in the April Number a short story, At the Arrow Forks, a tale of the Yukon. Miss Gaunt is a British woman who knows her Canada well—from sojourn, visit and study.

James B. Hendryx is a well-known writer whose 90,000-word serial story begins in the April MacLean's, The Gun-Brand, is of the Peace River Country, and is of gun-runners, Indians, whiskey, a Hudson's Bay Company post, voyageurs, and a dream of a girl.

Agnes C. Laut, H. F. Gadsby and W. A. Craick are contributors to the April MacLean's. Each contributes a special article of great and immediate interest. For example, MISS AGNES C. LAUT, a wonderful woman, writes of the war situation as found in the United States, and in its relation to Canada. H. F. GADSBY writes of the Canadian Senate—a judicial article on a subject of ever-growing political interest. W. A. CRAICK'S contribution is Motor Roads of Canada, and is concerned with motor-touring in Canada. His article is well illustrated.

Now, these are just a part of the contents of

MacLEAN'S for April

THEY suffice, however, to give you a good idea of the distinctive Canadian character and appeal of MacLean's, and to let you and others see that in MacLean's one gets his money's worth and more, whether it be mere entertainment that is sought, or something informative, stimulating and timely concerning Canada life, interests, thought and politics.

Circulation Representative

This is an advertisement which is appearing in all our papers on the April issue of MacLean's. This issue is an Automobile Number and is one of the best yet.

Study the contents herewith carefully, and best of all—Cash in on it.

JENKINS BROS.' "Type K" BRASS GATE VALVES

MADE IN CANADA

Only the WEAR and TEAR of HARD, CONTINUOUS SERVICE is the TRUE TEST of a VALVE.

EFFICIENCY, under the most exacting conditions, has PLACED and KEPT TYPE "K" GATE VALVES in thousands of up - to - the - minute POWER PLANTS.

Their design is graceful, the metal is evenly distributed so as to insure rigidity and strength, preventing distortion due to strain or shock, and are of the DOUBLE WEDGE type.

Unlike Valves with a solid wedge, the Discs in the TYPE "K" VALVE will not jam in the Valve body, for the first movement of the Spindle loosens the Discs and the guides in the body remove them from the seat-faces.

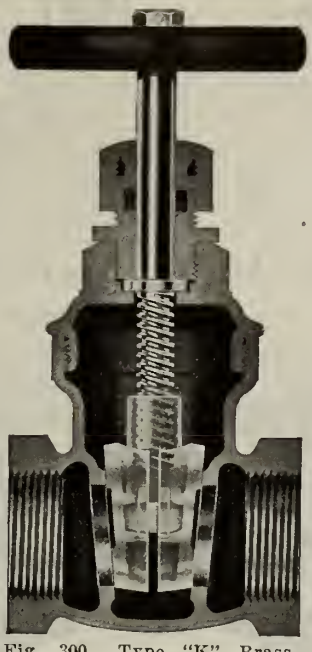


Fig. 300. Type "K" Brass Gate Valve. Screwed. (Sectional View)

TYPE "K" GATE VALVES are a "TRIED" VALVE.

In SERVICE they have PROVEN themselves to be WITHOUT an EQUAL.

They are not sold for trial or testing purposes, but to stand hard, continuous work.

GUARANTEED against defects in MATERIAL or WORKMANSHIP and in other respects carrying the usual JENKINS BROS.' GUARANTEE OF SERVICE and SATISFACTION.

Registered and approved for use in the Provinces by the Department of Public Works.

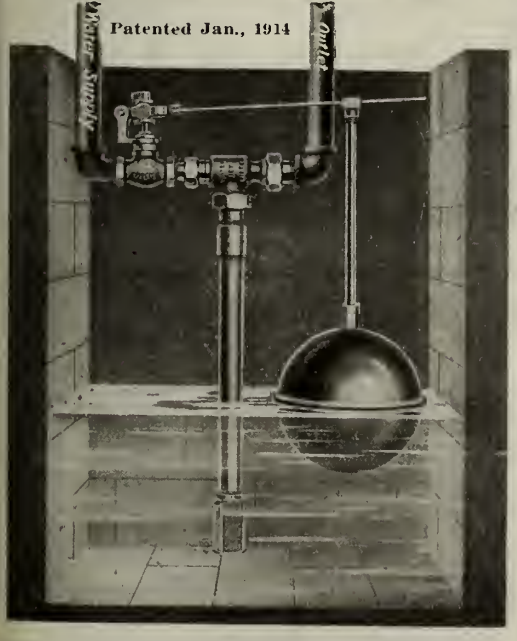
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JENKINS BROS., Limited

TRADE JENKINS MARK

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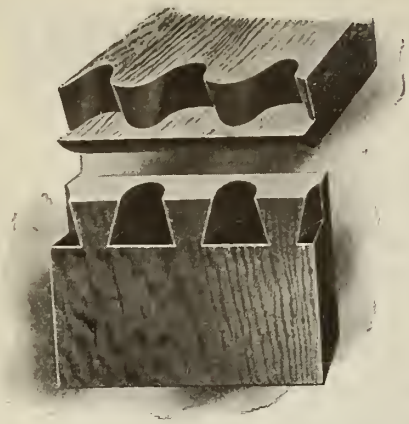
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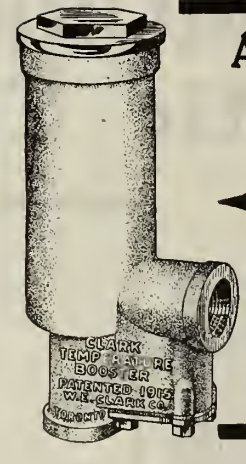
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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, MARCH 15, 1917 No. 6

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THE SANITARY ENGINEER

VOL. XI MARCH 15, 1917 No. 6

Clay Tile Pipe vs. Cast Iron

Pros. and Cons. Discussed Regarding a Question Which Has Been Settled by True Sanitary Engineers Over 40 Years Ago—Health is Secondary to Wealth According to ill-advised would-be Economists—How the Public of Burlington, Ont., are Being Misled

IT is a matter sincerely to be regretted that in any town or city in Canada the public should be misled, misinformed, and made to feel that certain laws regarding the kind of material which must be used in carrying away sewage from the vicinity of their buildings and dwellings are arbitary, and an imposition, and that such materials are too costly, and not as good or better than inferior material, or shall we say material that has over 40 years ago been condemned by men of practical experience, men who have taken out thousands of feet of clay tile pipe, men who have dug hundreds of cubic feet of putrid decomposed filth from the interiors of dwellings, all because of leakage from such pipes.

In Burlington, Ontario, a nice little town, on Lake Ontario, away from the smoke and dirt of Hamilton, away from the noise and turmoil houses are being built. People are full of a desire to have their town a place to be proud of, a place where pollution shall have no part, where health shall be first, last and always, the greatest consideration, and these people are being deluded into thinking that they are being imposed upon because certain clauses in their plumbing by-law very properly demand that nothing but cast iron pipe be installed within the walls.

It might not be out of place to reprint the clauses to which exception is being taken and which read as follows:

Clause 13

Pipes.—That the house sewer from the street sewer to a point three feet outside the foundation wall of the building shall be of standard salt-glazed sewer pipes, but if laid in ground liable to settle, **Heavy cast iron pipes shall be used.**

Clause 14

Iron Pipes. — That in passing through or beneath foundation, basement or cellar wall, **one heavy cast soil pipe shall be used,** this pipe to project about three feet beyond the outer face of the wall, and the hub end to be set flush with the inner face of the wall, this end to be sealed with a disc of wood and portland cement mortar.



Dominion Bank Building, Cor. Yonge and King St., Toronto.

Clause 15

Sizes.—That the diameter of the house sewers and the proportions to be constructed of tile and of iron, shall be as the engineers or other person appointed may prescribe, but generally the house sewers shall be six inches in diameter from all premises and all buildings except small detached residences where there is sufficient inclination and there are no bends in the line.

Clause 16

Soil Pipes.—That heavy cast iron

soil pipes, jointed with molten lead and caulked, shall be used exclusively within any basement or cellar, or beneath any building for carrying sewage or roof water; tile sewer pipes, porous agricultural draw pipes, wooden pipes, sheet metal pipes, etc., being prohibited for this purpose.

A little study of the above clauses will show that there is absolutely nothing that any practical man would take exception to. But we find that Alderman H. Cleaver appears to be looking for a little cheap popularity, is posing as an economist, and by the way he is championing clay tile pipe, one would almost be led to think he is interested in some funeral undertaking business. If the matter had not taken such a serious turn, if Mr. Cleaver had not wasted so much of the Burlington Council's time, the whole thing would have passed off as a joke, the whole affair is so ridiculous and almost beneath the notice of any serious, sane practical man.

With a view to proving that **cast iron soil pipe is the only fit kind of drain pipe for use within the walls of any building, and, further, that before many years cast iron soil pipe will take the place of tile pipe from the vertical stack to the main sewer,** THE SANITARY ENGINEER lately took the following step:

A circular letter was sent out to 150 of the most prominent men—men who have actually been engaged in the field of sanitary engineering for some half a century, in different parts of the Dominion. The circular was also reprinted in THE SANITARY ENGINEER of March 1st, on page 17, and read as follows:

We Want Your Opinion

Dear Sir:—The question of using clay tile pipe under dwellings is being discussed just now in many districts, and some persons are taking the stand that cast iron soil pipe is too costly and is no improvement over clay tile pipe. We are, therefore, taking the liberty of asking you for your valued opinion on the matter. Just fill in the spaces below and return the sheet to us in the enclosed envelope.

1. Do you favor the use of clay tile pipe under dwellings or buildings? If so, why?

2. Do you favor the use of cast iron soil pipe (medium or extra heavy) under dwellings or buildings? If so, why?

3. What is the law regarding above questions in your town?

In reply to this letter, we have already received scores of replies from every part of the Dominion except B. C., and not one yet has favored the use of clay tile pipe.

The following are some of the replies to our questions in their regular order, viz., 1, 2 and 3:

From Toronto

1. No; absolutely no.

2. Yes. (a) More sanitary. (b) More difficult to cut openings in, as is the case with tile pipes that are being punctured for all kinds of repairs and left open. (c) More lasting.

3. Optional, clay tile or iron.

R. J. S.



Royal Bank Building, North-West Cor. of King and Yonge Sts.

Reply No. 2—

1. No.

2. Yes, extra heavy tarred pipe, with caulked joints. If tight when installed, can be relied upon to stay tight for years.

3. Tile or iron, both are allowed. Iron must be extra heavy, with leaded joints.

H. S.

Reply No. 3—

1. No, I certainly do not, except for sub-surface drainage. My past experience teaches me that when exposed to sudden changes of temperature, you never know when it is safe. Life is short at its best, so why should we take any chances? It should not be a matter of difference in cost; it is a matter of health. Which is the cheapest?

2. I certainly do. Extra heavy tarred soil pipe is best. Material for a house drain should be some hard, strong, non-corroding substance that will not break on being exposed to sudden changes of temperature. The surface rust on cast iron soil pipe under ground forms a protective coating that remains as a barrier against the destructiveness of corrosion for all time. Specializing in smoke testing as I do proves to me which is best.

3. It is optional which pipe we use. Sorry to say that the council of 1913 turned down the experience of the domestic sanitary engineers with reference to enforcing the use of cast iron house drains, and stayed by the speculative builders and use of tile pipe, in helping to save a few dollars at the risk of the health of the people of Toronto, who have to live above the leaking ground-polluting tile pipe.

The above expression of opinion was submitted by John Wright, chairman of the sanitary committee of the Toronto Society of Domestic Sanitary and Heating Engineers.

Mr. Wright is a born sanitary engineer, and enjoys the confidence of more individual thinking men in Toronto than, perhaps, any other man in the trade. His father before him was one of the men who saw Toronto in the early '30's; he, like his son, also practised in the plumbing trade.

Reply No. 4—

1. I am not in favor of tile drains under dwellings or buildings, as they are easily broken and, therefore, become insanitary and a menace to the public health.

2. Yes. I am in favor of iron drains under dwellings and buildings, as I consider it much more superior to tile in many ways.

One reason is, it cannot be broken as easily as tile. There are many other reasons, which space does not permit me to go into.

3. We are allowed to use either clay tile or iron.

T. M.

SANITARY ENGINEER purposes, in coming issues, quoting more replies from various parts of Canada. But before so doing it might not be out of place to mention at random a few buildings that, in spite of the fact that it is optional in Toronto as to which kind of pipe is used, tile or iron, preferred to have cast iron pipe installed. The following are the first to come to mind:

The City Hall, Toronto; all the public schools recently built—that is within the last few years; the new Dominion Bank, corner of Yonge and King Streets; the new Royal Bank Building, corner of Yonge and King Streets; the C. P. R. Building, on the opposite corner; the Traders' Bank, Yonge Street; the Lumsden Buildings, Yonge Street; Parliament Buildings; all the buildings in connection with the Toronto General Hospitals; the new Government House, and the new Union Station. In fact, we could fill this issue if we were to mention all the buildings in Toronto in which cast iron pipe is installed **on its merits.** Now let us quote a few replies from other parts of Canada; from small towns as well as big cities:

Renfrew, Ontario

1. No.

2. Cast iron, because it is less liable to get broken, and has the advantage of few and stronger joints.

3. Tile pipe is not allowed under buildings.

Hamilton

1. No. Tile pipe is in no way as durable as iron. It will flake or chip with changes in temperature.

2. Yes.

3. Either tile or iron. W. J. C.

Port Arthur

1. No, I am not in favor of tile pipe under buildings, because tile pipe could not be made sewer-gas-tight.

2. In all cases I would use extra heavy cast iron soil pipe underground, and would prefer the pipe tar coated.

3. Medium pipe is used here, except on high buildings, when it must be extra heavy. A. C. W.

Ottawa

1. No, not under any circumstances.

2. Yes. Medium if cost is considered; otherwise extra heavy on account of its superior strength, fewer joints required with iron, and it allows a more perfect joint. Caulked lead joints will allow slight settlements to take place without fracture.

3. Ottawa City by-laws call for medium or extra heavy cast iron soil pipe uncoated, carried to a point not less than two feet outside foundations. Clay tile pipe not allowed inside any building.

A. W. A.

Here are two letters on the subject:

I.

Editor THE SANITARY ENGINEER.

I take the liberty to ask you to advocate personally and in your journal the substitution of cast iron pipe in place of the tile now in general use inside of buildings, and to have this iron pipe extend 2 feet through the foundation walls. By so doing there will be a straighter and more rigid job made, and every branch and junction will be taken off at their proper angles. It can be better supported with less danger of breaking through settlement, and this will be a safeguard to the health of the occupants or the tenant, as the case may be. I have found out through my experience since becoming a plumbing inspector that anything is good enough for the tenant. As long as he exists to pay the landlord his month's rent in advance he is a very good fellow.

As regards this tile drain trouble, I might state that in 1909 I was the advocate in getting all tile eliminated and a new clause added to our by-law calling for cast iron. Up to that time we had some very insanitary cellars owing to defective workmanship and tile pipe. Drains were improperly laid with broken joints. Pipes with holes punched in them to let water off cellar floors, by incompetent workmen, and the hole left and the earth thrown over the pipe, allowing sewer gas to escape into the building.

I might also say that since 1909 we have had very little trouble with the cast iron drains laid since that time, but we have a lot of trouble with the old drains laid previous to 1909, and will have until they are replaced by cast iron. I also hope to see the time when the cast iron drain will yet extend to the street sewer.

Yours truly,

J. JACQUES,

Asst. Plumbing Inspector.

II.

In reply to yours of the 22nd, instant regarding tile drains. In Ottawa the use of tile drains are prohibited inside of all buildings since 1909. The trouble we found from experience being that it was almost impossible to secure a water tight joint. Also men of inexperience often undertake to install drains and when inspections are made we found it impossible to allow same to remain.

Also in making any alterations or repairs openings are made without the knowledge of the Health Department which caused very insanitary conditions to prevail.

Another matter of great annoyance is where wet cellars prevail, openings are punctured in the pipe and same remain open allowing sewer gas to enter the building and this often causes sickness to the occupants.

I also find in attending to complaints regarding tile drains that in the majority of cases the trouble is caused by improper joints and branches.

Sharp angles are made by cutting off the pipe to form an elbow. I would strongly recommend the cast iron soil pipe for all plumbing work, same to continue to at least three feet outside the foundation.

Hoping you will be successful in convincing the Board of the importance of installing the cast iron pipe.

Yours very truly,

S. Daughtry,

Chief Plumbing Inspector.

Hespeler, Ont.

Question 1. Answer No.

Because 1.—They are not so strong as iron.

2.—There are too many joints (being made in 2 ft. lengths).

3.—They are not perfectly made usually having flaws.

4.—More liable to inferior workmanship as any handy man is generally employed to lay the pipes and make the cement joints.

5.—You are not able to give them a severe test as a few pounds pressure per square inch would at least burst the joints and of course in my opinion the water test is the only genuine test.

6.—Although laid with a true gradient when filled in, is apt to get disturbed unless laid in concrete.

Question 2, Answer Yes.

Because 1.—The advantage of ex-heavy iron soil pipe includes greater resistance to pressure either crushing or bursting.

2.—Fewer and stronger joints.

3.—More permanent soundness.

4.—Not so liable to bad workmanship as generally laid by plumbers.

5.—If they are to stand a water test the joints cannot be carelessly made, of course, all iron soil pipes should be coated with a solution such as Dr. Angus Smith's. I would suggest that outside iron drains should be ⅜ in.. thick.

Question 3. Answer:

Cast iron soil pipe shall be used from 3 ft. from outside wall to 2 ft. above roof, all soil pipes in cellar either under or above the floor must be cast iron.

(Continued in next issue.)

TRADE BRISK IN MONTREAL

"These are busy times for the plumbing trade in Montreal," remarked Alexandre Charette, president C.S. of D.S.H.E., to SANITARY ENGINEER, the other day. "The main trouble, however, at present is to get delivery of the necessary materials. This and the increasing cost of the metals is making matters more difficult for the trade, though there is plenty to do."



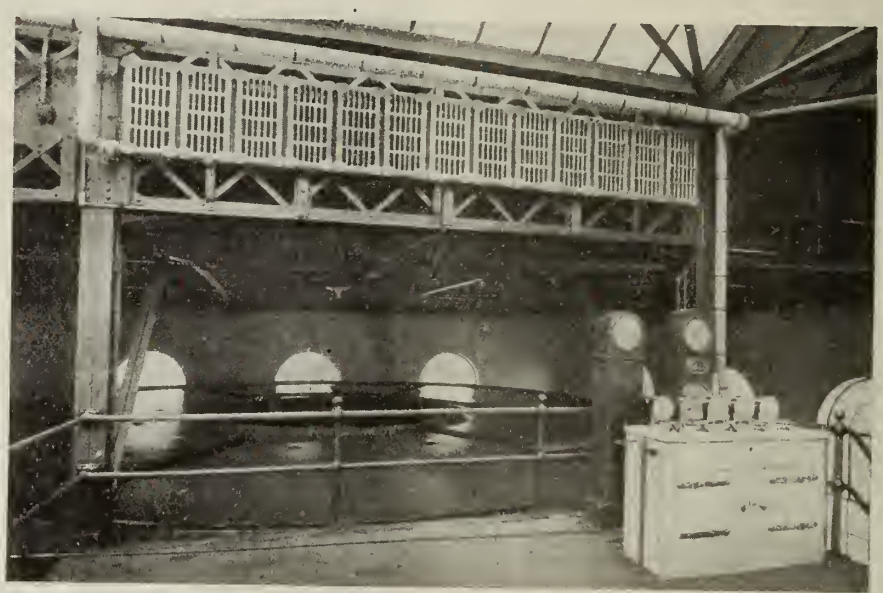
A plant of the nature here described and illustrated embodies in its make-up and result accomplishment features of interest alike for the sanitary engineer and private citizen, no matter their community or national location; the necessity for pure water, either for consumption alone or as a food constituent being generally recognized as a public health essential.

By A. G. Webster.

ARTICLE 2

THE area occupied by the entire plant is nearly 2½ acres. At the lake end of the plant is the suction well, connected to chambers near the lake by two 72-in. diameter steel pipes, through which the water flows by gravity to the well. To the west is the coal and chemical store, a concrete structure located near the wharf so that the materials coming over on scows can be handled with facility. Next, to the north, is the boiler house, with the pumping station adjoining. A chimney is built to the north of the boiler house, and the wash water tank is situated between the pumping station and filter house. The chimney was built by the Custodis Canadian Chimney Co., Toronto and is 122 feet high above boiler grate bars, and 7 ft. inside diameter at the top. It is constructed of buff pressed brick outside, and "Custodis" perforated radial brick inside, with a firebrick lining 40 feet up. The wash water tank was built by the Canadian-Chicago Bridge & Iron Works, Bridgeburg, Ont. The tank is of steel and has a capacity of 2,000,000 Imperial gallons. Its bottom is 60 feet above the ground and 45 feet above the top of the filters. The filter house is on the north side of the plant and is connected to the pumping station by a tunnel in which is also a 72-in. venturi meter.

The sand for the filters was obtained from pits on the mainland. The sand was taken in cars to the sidings at the foot of Spadina avenue and towed across on scows to the Island, being afterwards prepared at the site. All coal required is taken over the same way. During the construction of the plant the contractors had their own carpenters, blacksmiths, and machine shops. Philip J. Duff has been resident engineer in charge of the plant since the work started. Considerable care had to be exercised and special precautions adopted when excavating and building the foundations owing to the water-logged condition of the land. The buildings, with the exception of the coal and chemical storage, have reinforced concrete foundations, with concrete substructures carried up to a height of one foot below the finished ground level. The superstructures of the buildings are of buff pressed brick, and on the steel frame work forming the roof is placed boarding with red Spanish tile on top. The window frames are of pressed steel sash, fitted with wire glass. The floor and substructure of the filter house are built in sections with joints to allow for expansion or contraction.



View of filter unit in operation, showing raw water coming up through various inlets. The operating table, venturimeter, and loss-of-head gauge are to be seen in the foreground.

Suction Well

The suction well building is 40 ft. square and the suction well is 24 ft. diameter and 25 ft. deep. The water comes from the lake into two chambers near the lake front and flows by gravity through two 72-in. diameter steel pipes, one from each chamber to the suction well. All the end of each pipe in the well is a 72-in. hydraulically operated gate valve supplied by Glenfield & Kennedy, Kilmarnock, Scotland. The valves are operated at a pressure of 700 lbs. per sq. inch from hydraulic pumps and accumulator located in the pumping station. The valves open the full 6 ft. in 2½ minutes. The suction well is used as a screen chamber from which the water is taken by three 36-in. pipes to the pumps. There are six sets, being 3 screens to each set, of fine mesh copper in duplicate, so that one set can be taken out.

for cleaning while the other set is in operation. The suction well has a surge overflow in the event of any sudden failure of the Hydro power. There is a Builders' Iron Foundry indicating instrument for indicating the water elevation at all periods. The building is steam heated and there is also a 1-ton crane provided for lifting the screens. The coagulant is introduced to the water in the well, coming through duplicate pipes from the chemical building.

Chemical and Coal Storage

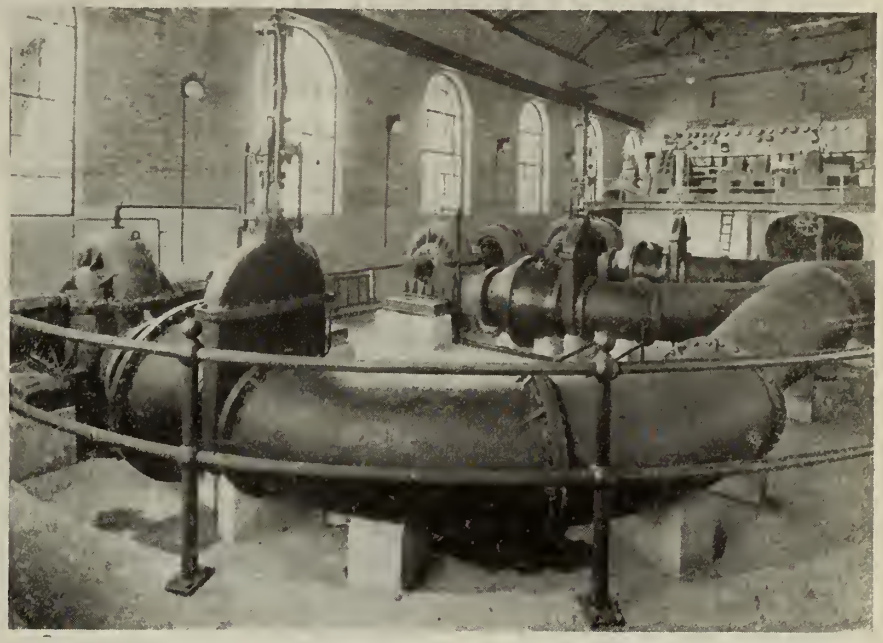
The building comprising the chemical and coal storage is constructed of reinforced concrete. The chemical building is circular, being 40 feet diameter, the upper part carrying a horizontal 4-ton crane with 60 ft. reach for unloading scows at the wharf. The coal storage is built around the chemical buildings except at the front, which is straight. The coal storage has a capacity of 1,500 tons. The chemical building will hold about 800 tons of sulphate of alumina or alum, as it is more generally called. Around the storage bin are a number of doors through which the alum is fed down to a tray at mid-level in the dissolving channel maintained full of water. The solution is fed from this channel into a dilution tank in which it is automatically diluted down to the standard 5 per cent. by an arrangement similar to a hydrometer. From the tank the solution is fed into a measuring tank controlled by the 72-in. venturi raw water meter in the pumping station through a combined electric and hydraulic relay. From the bottom of the measuring tank the solution gravitates through lead pipes to the suction well and is there distributed throughout the raw water.

In this apparatus, which is in duplicate, the annular dissolving channel tank is kept full of filtered water by a float valve. From the water tank the water flows freely to the dissolving tank and, after dissolving, the alum passes through a valve at the top of the hydrometer. At the same time the water also comes from the water tank to a valve at the bottom of the hydrometer. The hydrometer is poised in the solution between the two valves. Any vertical movement of the hydrometer opens one valve and closes the other. Thus it will let in strong solutions at the top and water at the bottom until the balance is obtained, at which the hydrometer just floats in a solution containing 5 per cent. of aluminum sulphate.

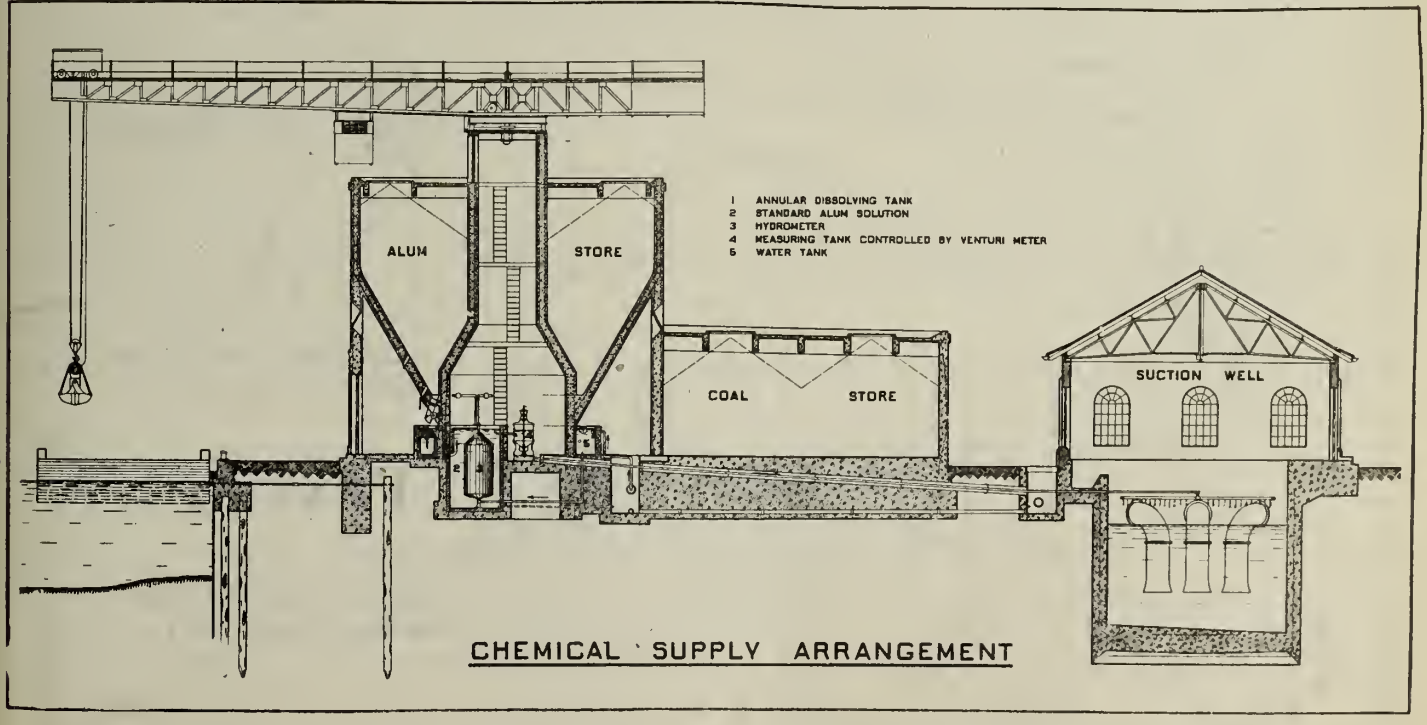
Filter House and Filters

The filter house is 277 ft. long by 123 ft. wide. It contains ten steel filter tanks arranged in two rows, each tank being 50 feet diameter and 14 ft. deep. Between the two rows are the mains for the raw water, filtered water, and waste water. These mains are connected with each filter by cast iron pipes equipped with hydraulically operated gate valves. The operating gallery extends the full

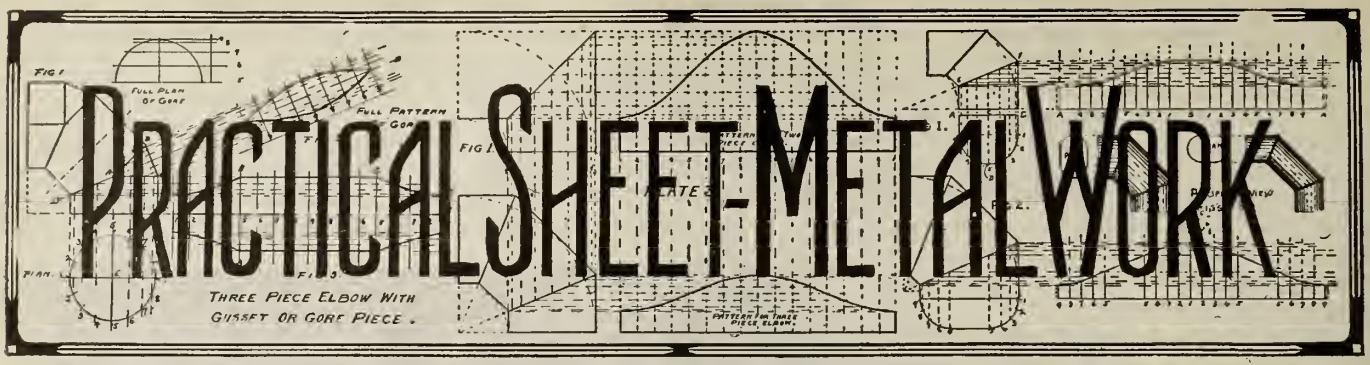
(Continued on page 27.)



Interior view of pumping station, showing three 36-million gallon "De Laval" pumps.



CHEMICAL SUPPLY ARRANGEMENT



BY THOMAS STANFIELD

IN article seven the first problem in elbow pattern development was described. In a number of issues elbow pattern development will be dealt with. Elbows of all kind sizes and shapes.

It will be seen by referring back to the article mentioned that the pattern shown was that of a round two piece elbow.

The problem to be taken up in this article is that of describing two forms of two pieces to fit elliptical pipes.

First determine the true shape of the elliptical pipe. The plan in Fig. 1 is the assumed shape of the pipe. From this plan draw an elevation A B C D, and describe the mitre E F. Next divide the plan into equal parts as shown at 1, 2, 3, 4, 5, 6, 7, 8, 9. From these points erect perpendicular lines, each cutting mitre line E F.

Now draw a stretchout line see B B. Fig. 2, and transfer the measurements from the plan Fig. 1 beginning at B 9, 8, 7, 6, to 1, and repeat to the right until B. 9 is reached. From each of these measurements erect the required number of perpendicular lines to the height of the elbow desired.

Now draw a number of dotted lines from points already cut on the mitre line in Fig. 1, until all the vertical lines in Fig. 2 have been intersected.

To complete the pattern, draw a thicker solid line from each point where the dotted horizontal lines have intersected the perpendicular solid lines allowance must be made for seams or locks.

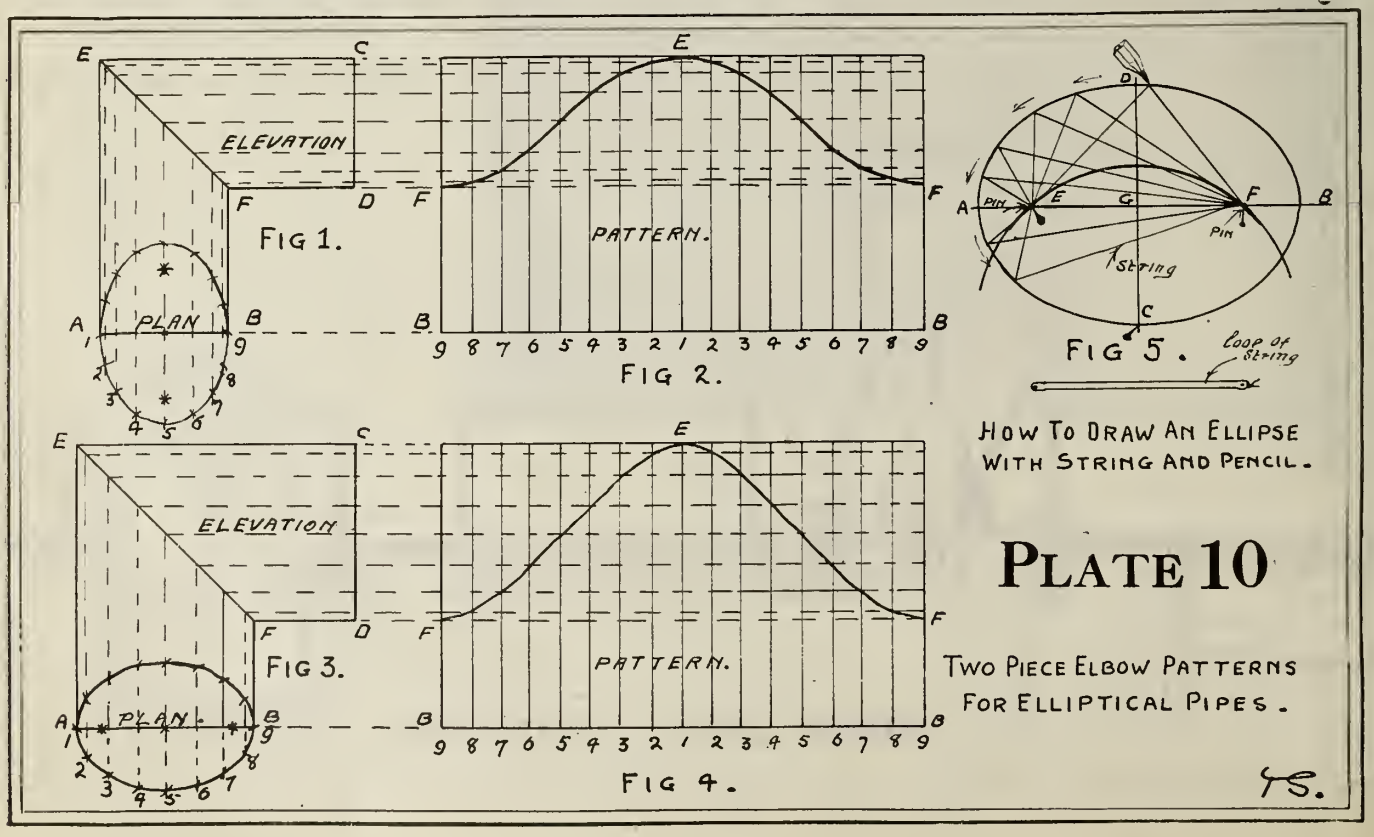
Figs. 3 and 4 show another form of elliptical elbow, the pattern of which may be developed by repeating the instructions given for development of pattern Fig. 2.

Fig. 5 shows an enlarged view of an ellipse, which can be drawn by the use of two pins, a piece of string and a pencil. To draw an ellipse in this way first determine the length and width required and draw two lines at right angles as shown at A B C D G, with A or B as centre open compass to G and with C as centre, draw an arc cutting line A B, as at E F. Now place pins at E F and C and tie a loop round the three, remove the pin at C and insert a pencil, keeping the string taut draw the ellipse.

(Continued in Next Issue

TO ORGANIZE RESOURCES

ONTARIO—The membership of the provincial organization of resources committee has been considerably extended by the Government. Sir William Hearst, Premier of Ontario, announced that the following gentlemen had been added to the committee to assist in organizing Ontario's resources. Norman Sommerville, Toronto; W. J. Bell, Sudbury; Hon. H. W. Richardson; William Wellatt, Walkerville; Fred Cook, Ottawa; M. J. Haney, Toronto; Dr. W. A. Riddell, Toronto; W. E. Rundle, Toronto; Arthur Little, London; William Dryden, Brooklyn; Walter Rollo, Hamilton; Dr. G. C. Creelman, Guelph.

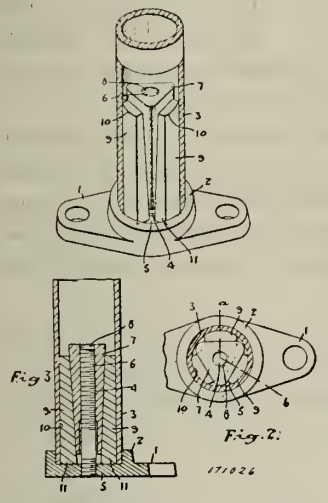


New Canadian Patents

No. 17,026.

Daniel M. Fraser, Toronto, Ontario, Canada, 25th July, 1916; 6 years. Filed April 26th, 1916. Receipt No. 264,712.

Claim.—1. In a pipe fitting the combination with the pipe, of a member adapted to abut the pipe end, a threaded stud secured to said member abutting the pipe end, a central wedge member threaded to receive said stud, and a plurality of wedge members adapted to engage the inner wall of the pipe and the central wedge member.



No. 171,026. Pipe Fitting

2. In a pipe fitting the combination with the pipe, of a member adapted to rotatably abut the pipe end, a stud secured in said rotatable member and extending within the pipe, a wedge member threaded on said stud, and a plurality of loose wedges engaging said central wedge and adapted to be forced outwardly thereby to engage and grip the inner wall of the pipe.

3. In a pipe fitting the combination with a pipe, of a fitting adapted to rotatably engage the end of the pipe, a threaded stud secured to said fitting and extending within the pipe, a wedge having a central hole extending from end to end, said hole being counterbored at the small end of the wedge and threaded to engage the stud toward the larger end, and a plurality of loose wedge members arranged within the pipe and adapted to engage the central wedge member.

4. In a pipe fitting the combination with the pipe, of a fitting having an annular projecting flange adapted to encircle the pipe end, a stud secured in said fitting centrally in relation to said flange and extending within the pipe, a wedge member threaded upon said stud having its small end arranged toward the fitting, and a plurality of wedge members arranged within the pipe and engaging the central wedge member and abutting the fitting and adapted to be expanded outwardly to engage the inner wall of the pipe.

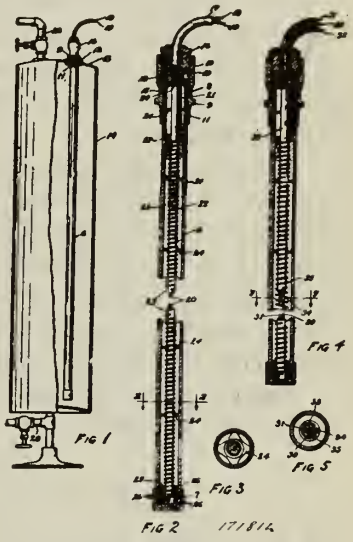
No. 171,814.

Phillip F. Apfel, Seattle, Washington, U.S.A., 12th September, 1916; 6 years. Filed 6th June, 1916. Receipt No. 266,341.

Claim.—1. An electrical heating device of the class described which embodies a container made of a metal tube closed at one of its ends by a suitable end wall, a metal surface of said container, said one end having an internal screw thread while its other end portion is provided with an external screw thread a perforated disc of insulating material disposed within said sleeve to engage with the annular end surface of said container, a bushing screwed into the outer end of said sleeve, electrical conductors disposed to extend from the interior of said container outwardly through said disc and said bushing to the exterior of said container, oil proof insulating material disposed to fill the space between said disc and said bushing and around said conductors, an electrical heating element comprising a length of bare wire of helical form disposed within said container and connected with said electrical conductors. means for preventing electrical contact between said heating element and the wall of said container, and a body of electrically non-conducting fluid disposed within said container to submerge said heating element.

2. An electrical water heating device of the class described which embodies a metal tube provided with a cap disposed to close one of its ends and further provided with a sleeve mounted on its other end portion. said sleeve extending a portion of its length beyond the end surface of said tube and said extended portion being provided with an internal screw thread, a body of oil disposed within said tube. an electrical heating element comprising a length of metal wire placed within said tube in a position to be submerged in said body of oil, insulated electric conductors connected with the terminals of said heating element and disposed to extend therefrom through said sleeve to the exterior of said tube, a perforated disc of insulating material disposed within said sleeve to cover the end surface of said tube to close tightly the annular space between said electric conductors and the inner surface of the end portion of said tube, a body of gum shellac disposed within said sleeve to adhere to the outer side of said disc and to said wires thereby hermetically to close the entrance to said tube, and a bushing provided with an external screw thread and disposed to screw into the screw-threaded end of said sleeve to surround said insulated electric conductors and to engage with said body of gum shellac.

3. An electrical water heating device



171,814. Electric Heater.

of the class described which embodies a metal tube closed at one of its ends by an end wall, while its other end portion is provided with a sleeve that extends a portion of its length beyond the end surface of said tube, an electrical heating element disposed within said tube, a body of electrically non-conducting fluid disposed within said tube to surround said heating element, electric conductors connected each with a different point on said heating element and disposed to extend therefrom through said sleeve to the exterior thereof, a perforated disc of insulating material disposed within said sleeve to cover the end surface of said tube tightly to close the annular space between said conductors and the inner surface of the end portion of said tube, a body of gum shellac disposed within said sleeve to adhere to the outer side of said disc and to said wires thereby hermetically to close the entrance to said tube, and a bushing disposed to close the end of said sleeve to surround said conductors and to engage with said gum shellac.

THE SANITARY ENGINEER

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MARCH 15, 1917

NO NATIONAL CONVENTION

AS announced on another page, there is to be no convention held this year in connection with the Canadian Society of Domestic, Sanitary and Heating Engineers.

It had been decided at the last convention held in London, Ontario, that Montreal was to have the convention of 1917. However, as the president announced, it was felt that as affairs are in such an unsettled state, and as there is a shortage of labor, with a resultant rush of work to be completed, the time could ill be spared this year.

From what we can learn the convention is simply postponed until 1918.

ANOTHER NEW SERIES

WE HAVE received such a splendid response from our readers to a letter we mailed out and have also had so many answers from readers in reply to questions asked on page 17 of last issue, that we have decided to publish a series of articles regarding the problem of clay tile pipe versus cast iron soil pipe for use under buildings. They will be illustrated in many ways, by proofs showing broken tile pipe choked full with roots, putrid matter having to be dug out of buildings caused by leaky, cracked tile pipe, etc., and we feel that such articles should be of great interest not only to sanitary engineers, but to others also. If any readers know of men that are opposed to the use of cast iron pipe, and who are apparently in earnest in their ideas; such readers will do well to preserve the next 6 or 8 copies which will contain conclusive proofs as to its desirability.

The question should never again have been raised in these days, but it appears that there are some who are not living actually in the present age, except physically; mentally they belong to the dark, dank ages of pollution, pestilence and plague, days that prevented the Panama canal being built, days that saw Rome a mass of filth, days that brought conditions about which were responsible for the plague in Old London. And, sad as it may seem, these people are wishing to cater again to those atavistic, deadly conditions, which brought disease and death to thousands upon thousands of innocent souls.

The seriousness of the question is even greater than in days gone by because of the fact that in those days people knew no better and learned the lessons that we in these days may live healthier lives, enjoy conditions that to some extent were denied those who lived in days gone by.

Testing drain pipes was a thing unknown in the days of clay tile drains, and to subject such pipes to the hydraulic test, which is by practical experience found necessary, would be to burst every length installed.

Then again, traffic was not so heavy in those days as is the case to-day. Our towns and cities are subjected to one continuous series of vibrations, which is breaking tile drains wherever laid, almost without exception.

The following is a report taken from a technical paper published in London in the year 1913, and referred to the destruction of drain pipes. This article appeared in THE SANITARY ENGINEER of Oct. 1, 1913, and has since been verified in writing.

"The heavy motor-bus traffic near St. Paul's, London, England, has shaken and cracked the columns of the cathedral so seriously that the government is considering how the vibration can be lessened.

"All large cities, however, are in a constant state of vibration. In places like London, Manchester, Liverpool and Birmingham, there is not a square inch of soil that is perfectly still.

"In some large cities and towns it has been found necessary to insist upon cast iron drainage pipes being used instead of earthenware ones. Even though these were embedded in concrete, the average earthenware drain pipes have been found to last only a few weeks uncracked.

"Last autumn Professor Ingleton experimented in different parts of London with a seismometer—the

instrument used in measuring earthquakes. He found that though the trembling of the earth was naturally less in the suburbs than in the city, and between 1 a.m. and 6 a.m., than at other parts of the day, the constant vibration was such as to render a seismometer in London useless for its real purpose of registering far-distant earthquake shocks, and that it would be necessary to find a fresh site for the Greenwich observatory, owing to the violent vibrations set up by the London traffic."

With such expert evidence at our disposal, it is painful to say the least, when one finds men trying to retard progressive measures and to revert to the days of ancient, outlived practice.

There is just as much scope for the use of clay tile pipe and more so, if properly applied, but we should see to it that clay tile pipe is not used in such places as to render liable leaking which causes ground to become polluted.

Let our practical experience predominate. Let sound health, not wealth be the aim to strive for.

NO SUDDEN DROP COMING

FOR some months past many buyers have followed a very conservative course. Some have unloaded stocks of goods at low prices in order to get from under before the crash comes. In some cases they could hardly be criticized, because it was generally felt some time ago that the top of the market had been reached and that lower prices on many lines were in the offing. Events of the past two months have made it quite clear, however, that high prices are going to prevail for some considerable distance into the future. Prices of many commodities will go still higher, before there is much chance of a decline. This is particularly true regarding hardware products. There is now a greater shortage of many basic materials than at any time since the outbreak of the war. Prices generally are firmer, and the output of many mills is contracted for up to the end of the year, and in some cases into 1918. Some authorities express the belief that the only reason why many mills have not sold up well into 1918 is their unwillingness to contract so far ahead. The average dealer cannot comprehend the immense tonnage of foreign business being rejected. It is stated on good authority that no matter when the war ends the United States steel and metal mills will have enough business on their books to keep their plants running full capacity for at least six months ahead.

There is a feeling now that the war will continue for at least another year, and perhaps longer. There is even now great danger of further complications in the international situation. There does not appear to be any good reason why there should be any appreciable decline in prices of hardware lines for many months to come.

INDUSTRIAL RESEARCH

THE making of shells has increased industrial efficiency: The shortage of labor has speeded up the men who are left in the shops: War measures have taught the need of improved organization and the folly of waste. Out of the welter and loss of this terrible conflict of nations, at least one benefit bids fair to emerge—a higher degree of efficiency in all pursuits.

A broader vision is already apparent in Canada. Men are looking to the future, are planning to avail themselves of the opportunities that are opening. The end of the war will usher-in an era of active participation in world trade. If present indications hold good, Canadian products will play a larger part in the markets of the world.

A good suggestion for further advancement along these lines comes from Industrial Canada. The need for industrial research is put forward as follows:

"The question of how industrial research can best be conducted is one of primary importance. Is it better to have all research organized and installed in a national institution, or is it better to let it grow wherever it will? There are some classes of physical inquiry that, like rare plants, will only grow on a particular soil. Under the inspiration of a particular individual or nurtured by the traditons of a particular place, they flourish and give to the world wonderful fruit. Any attempt to transplant them might end in the loss of the strain forever. Such researches should be nurtured by the state with suitable funds and facilities, but no interference should be made with this mode of growth.

"There are, on the other hand, many problems, the solutions of which have for long been wanted, and which are most likely to be solved, if at all, by being attacked on a large scale by many workers with almost unlimited funds behind them. They are the questions of the more economical consumption of coal, the more universal distribution of electrical energy, and numerous large chemical and electrochemical problems that can be carried out with greater expedition under state aid than by individual enterprise. For these matters one wants national physical laboratories, controlled by a commission on industrial and scientific research, such as is understood to be the scheme of the Minister of Trade and Commerce."

EDITORIAL BRIEFS

DO YOU get a profit on your past experience? It cost you heavily, in time, brain and brawn.

* * *

EXPERIENCE is one's most valuable investment in one's business, but it is very often given away.

* * *

WHY NOT make it pay part of your fixed charges? Or else invest it in some one else's business that will pay for your experience.

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 20.

WE are now at Article 20 in this course, in which I have tried —with what degree of success the reader can best judge—to explain in a simple yet comprehensive way the principles underlying the practice of the sanitary disposal of household wastes from residences in unsewered districts.

It is unfortunately not always possible to make articles as clear to the reader as the writer would wish and misunderstandings may occur. For example, in Article 18 (February 15 issue) the itemized cost of a septic tank and disposal tile system, as obtained from a bulletin on "Sanitation and Sewage Disposal for Country Homes," issued in the State of Missouri in 1910, was given as $43.50, approximately, exclusive of the cost of sand and gravel. Such information, though not as fully detailed as could be desired, was given principally as a rough guide to quantities and materials required and only as a very rough guide in estimating. At least one reader, however, understood this to mean present prices in Canada, where prices, varying considerably in different localities, are, unfortunately, everywhere higher than those quoted in the Missouri bulletin. This point was made clear in a subsequent paragraph of the original article. But lack of space caused it to be omitted in the printed article and this explanation, in justice to both author and readers is consequently made.

A knowledge of principles is termed a science, the actual carrying out of those principles in practice, an art. A science teaches us to know, an art to do. Art might be defined as science made efficient by skill. For example, metallurgy is a science, mining is an art. Upon astronomy, a science, the art of navigation is built. Chemistry, a science, is the basis of very many useful arts. "Plumbing" in either its original or wider sense, is evidently an art. As the term is now understood, the plumbing art depends on many natural sciences. In the problem of sewage disposal we have been, in these articles up to the present possibly more concerned with the various sciences such as chemistry, bacteriology, etc., than with actual constructional details, though some features of sewage disposal plants have been fully described. A number of bulletins issued by state and other authorities have been reviewed to show what has been done or advised in this most important sanitary question.

Before taking up further examples of sewage disposal plants, it might be of value to some readers to discuss more fully the design and construction of what is commonly called a "septic tank," and its accessories.

Tanks used for sewage disposal may be made of wood, brick, hollow tile, etc., each having its respective advantages and disadvantages. But for this type of construction concrete is generally considered the most desirable material.

What does the reader know of concrete and its uses? There are possibly some who would welcome and possibly some who need further knowledge on the subject if satisfactory tanks are to be constructed.

Concrete may be regarded as a manufactured or artificial stone. It is made by mixing together sand and stone (or gravel), with water and a cement—nearly always "Portland" cement. Various proportions of each are used, depending upon the use to which the concrete is put. In half an hour or so this mixture begins to stiffen, perceptibly hardening in a day or so, and in a month becomes harder than many natural stones.

The most important ingredient of a concrete is, of course, the cement. In fact, pure, or as it is termed "neat" cement, when wet with water would harden in a way to fulfill all the physical requirements of concrete, but it would be too expensive. Sand and stone are added to decrease the cost. If carefully mixed in proper proportions, their addition should not reduce the strength of a concrete.

In building construction the various cementing materials employed are obtained by heating minerals or stones composed wholly or partially of lime. Limestone is considered from a chemical standpoint to be composed of lime, combined with carbon dioxide, forming calcium carbonate ($CaO+CO_2=CaCO_3$). On burning or heating a limestone, the carbon dioxide is driven off in the form of a gas and lime or "quicklime" results. Mixed with water and sand, a lime mortar can be made. Everyone is familiar with the action that goes on as the quicklime is "slaked," the lime (CaO) uniting with water (H_2O) to form a fine powder [$Ca(OH)_2$], slaked lime. Heat is given off and the volume of the mixture increased two or three times.

Lime mortar is neither strong nor able to resist water. But it is economical, and for brickwork on smaller buildings it is sufficiently satisfactory.

All limes probably contain a small amount of clay. As this amount of clay increases, the strength of a lime mortar increases, as also its ability to set or harden under water (hydraulic limes). If the clay to lime exceeds the proportion of 40 to 100 an hydraulic cement results which does not slake, does not increase in bulk when water is added, does not subsequently shrink, does not need (except for economy) the addition of sand, and which possesses great strength and the ability to set under water.

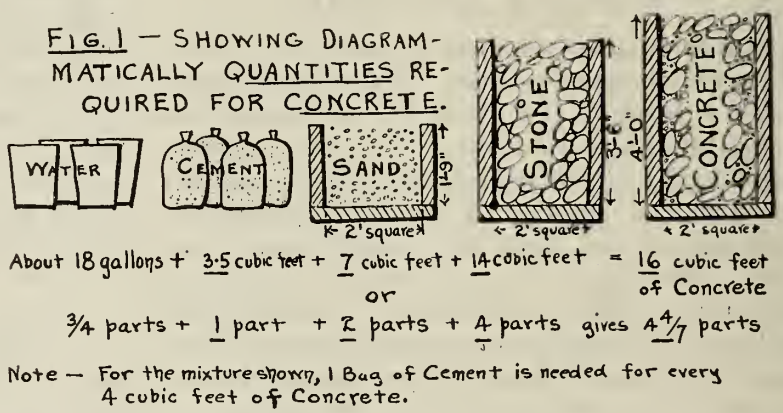


FIG. 1 — SHOWING DIAGRAMMATICALLY QUANTITIES REQUIRED FOR CONCRETE.

Certain natural limestones contain enough clay, so that when heated an excellent natural cement results, but there can be no guarantee of its uniformity. The best cement is that made by artificially mixing and burning materials containing lime and clay in correct chemical proportions. The resultant ground to a powder is termed Portland cement.

The history of the earlier cements and how Portland cement got its name is not without interest. The stones in the pyramids erected by the Egyptians were apparently laid in mortar of common lime and sand. It is thought by some that these ancients also knew how to mix lime and clay together to make a real cement many thousand years before Christ.

We know that concrete was made by the Romans several centuries before Christ. Lime mixed with sand and stone was ordinarily used, but to withstand the effects of water they found that volcano ashes (puzzolana) should be mixed with the lime which was then rendered "hydraulic."

Concrete such as the Romans used was employed in the middle ages for various structures—principally walls and foundations. It was not, however, till 1750 that John Smeaton, in connection with the erection of a lighthouse, found that from certain lines containing clay, a cement could be made that would set under water. Further investigations were later made with rocks that contained both lime and clay, and from these materials natural cements, as previously explained, are now made.

Portland cement was so named by its inventor, John Aspdin, of Leeds, England. He discovered in 1824 that if an artificial mixture of slaked lime and clay were burned together with great heat there was formed a cement desirable for all water work, as well as for strength. Its resemblance in color and other characteristics to Portland stone, much used in England at that time, suggested the name Portland cement.

When we to-day speak of concrete we have in mind that the cement used will be an hydraulic cement, or, as explained, one that can set or harden under water, and after setting, withstand the action of water. Of the various hydraulic cements, Portland cement is adaptable to any class of concrete construction; is unquestionably the best material for all such purposes, and is the one consequently advised to be used in the construction of sewage tanks.

In Canada, Portland cement as manufactured comes in paper bags, cloth bags or wooden barrels. The best way to handle it is in cloth bags, which contain about 87½ pounds of cement. Four such bags make a barrel of 3½ cubic feet in volume and (since one cubic foot of cement weighs about 100 pounds) about 350 pounds in weight.

Sand and stone or gravel should for economy be obtained locally. They should be "clean," i.e., free of clay, loam or vegetable matter, which would interfere with the binding qualities of the cement. The better the quality of stone and sand, the stronger, of course, the concrete.

Before taking up the most desirable sizes of sand and stone required, Fig. 1 might be given some consideration. Here are shown the quantities required under average conditions for a 1:2:4 concrete, or a mixture of 1 part by volume of cement to 2 of sand and 4 of stone.

When cement, sand and stone are mixed, the spaces, called voids, between the stones are filled with sand, the voids between the sand with cement. Consequently 1 part of cement, 2 parts of sand, and 4 parts of stone do not make 7 parts of concrete, but only about 2/3 of that amount.

The amount of concrete made from certain volumes of the various ingredients depends on the varying degree of roughness of the stone and sand, the relative sizes of the stone, sand and cement and the amount of water used.

The mixture in which all the spaces or voids between the stone or gravel are filled with sand and all the spaces between the sand are filled with cement is the ideal mixture. Then the resulting amount of concrete would be only equal to the amount of stone used, and relatively small amounts of sand, and especially cement, would be needed. Such an economical mixture is rarely or never attained in practice, as the voids in each load of sand or stone vary to some extent. In order to be absolutely safe, it is necessary to use more cement than might be estimated would fill the voids.

For wall work in sewage tanks, probably broken stone or gravel that will pass through a ½-inch ring is to be preferred to larger stone. If the stone is graded, the voids are less than with stone all of one size. This becomes evident when it is considered that the smaller stones can fit in between the spaces in the larger stones. Sand for the same reason should not be all fine, but should preferably have some coarser particles into which the smaller may fit. Sand with a large proportion of the grains measuring from 1/32 to ⅛ of an inch in diameter is a suitable sand. If the particles are all one size, coarse sand is much to be preferred to fine, as for equal strength it requires less cement.

In the next article some practical details of proportioning, mixing and placing concrete will be described.

(Continued in next issue.)

REDUCES NUMBER OF OUTSIDE CLOSETS

The Winnipeg Health Department recently completed taking the annual census of outside closets in use. The number is now reduced to 454, which, it must be admitted, is not an excessive number for a city with a population of 201,981. We doubt if there are many cities of equal size with the same record.

It is, of course, impossible for any growing city to construct sewers on all outlying streets so as to dispense entirely with the use of outside privies, but much can be done by a live Health Department to note all building operations and where necessary to recommend the construction of sewers and water mains. This has been our course during the past twelve years, and the result is fairly satisfactory, as the death rate from typhoid fever has been steadily reduced year by year from 248.3 in 1904 to 3.5 in 1915.

In order to diminish the danger as far as possible, the only outside privies allowed are constructed of concrete or of brick lined with cement.

Each year in the spring when the list of local improvements to be executed is being compiled, the Department sends up to the Board of Control a list of streets where sewers or water mains are needed. In this way this progressive health department is able to keep abreast of the situation.

PLUMBER EXCEEDS SPEED LIMIT

A certain plumber had a job which he wished to "speed up," so he jumped on a bicycle and started off on "high." A policeman nabbed him and took him before the judge for exceeding the speed limit. The judge asked his name and occupation, and when told, immediately instructed the policeman to turn his prisoner loose, saying, "This is the first plumber I ever heard of showing speed in any way and we must do nothing to discourage him."

NEW USE FOR ALLIGATORS

The alligator has graduated into the useful class. At last his sluggish energy has been usefully directed.

Recently a 600-foot 12-inch sewer pipe in Fort Meade, Fla., became clogged with sand and dirt. According to the "Engineering Record," several sewer-cleaning contrivances were used and about $4,500 was spent, but to no avail.

The pipe remained clogged as before. At this juncture the superintendent of water and sewers secured a small alligator, to which he fastened a rope. The alligator was lowered into the pipe. After a struggle in the unsavory environment, he reached the next manhole, dragging the rope after him.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

An advance ranging from 5 per cent. to 10 per cent. has been made on all porcelain enameled iron sanitary ware, which includes bathtubs, sinks, sitz, foot, and child's baths. Globe, angle and check valves, radiator valves and patent quick-opening valves have been marked higher. Wrought iron pipe has again registered an advance of $4 per ton. Bushings and unions are quoted 5 per cent. higher and galvanized sheets in certain brands have been increased 50c per 100 pounds. Black and galvanized sheets are becoming scarcer. Malleable fittings and cast iron fittings are among the items on which slightly higher prices have been put into effect. One grade of oakum is higher, while another grade is lower in price. Plumbers' spun oak, however, held steady in price. Old, heavy copper, heavy lead pipe, red brass and tea lead have all been moved higher. Manufacturers of enamelware report a slight cessation of business during March, as compared with January and February, when business was exceptionally good. Just at the present time there is a good demand for range boilers from munition plants.

TORONTO, March 13.—Business in enamelware lines was very good for the month of February. Indications for the present month point to quieter trade conditions. There have been general advances on porcelain enameled iron sanitary ware amounting to 5 to 10 per cent. The reason given by the manufacturers is the continued advance in the price of raw materials. Valves have shown an even firmer tendency in some classes than indicated in last issue. Galvanized sheets have been increased in price and steel pipe has again made a considerable movement in the upward direction. Bushings and unions are now quoted at a higher price through the change of discount. Old heavy copper is quoted ½c. pound higher. Lead products are all in firm market.

Plumbing Enamelware Advances 5 to 10%

BATHTUBS, SINKS.—An advance ranging from 5 per cent. to 10 per cent has been made effective on all lines of plumbers' enamelware. On the ordinary 4-foot, 4½-foot, 5-foot and 5½-foot the advance amounts to $2.10 on each size, which now makes the selling price $25.80. On the 5½-foot baths the advance has been $2.10 also, making the selling price now $29.40. On the sitz, foot and child's baths, the advance has been 5 per cent. On apron colonial sinks of Port Hope Sanitary catalogue plate Nos. F301 and F302 and the roll rim colonial sinks catalogue plates Nos. G5450 and G5451 the advance has been 5 per cent. On sinks of Standard Sanitary Company an advance of 5 per cent has been made on catalogue plate Nos., 6706-6731 and Nos.6815-6831. All other enamelware is included in 10 per cent advance. On roll-top sink, 18x30 inches, the advance has been 10 per cent, on previous price, making the price now 13.35. Range boilers have held steady during the week at the advances recorded in last issue.

30-gallon range boilers, standard	$10.50
30-gallon range boilers, extra heavy	13.00
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	25.80
Bathtubs, 5½ ft.	29.40
Sinks, roll-top, 18 x 30 in., staple	13.35

Globe, Angle and Check Valves Higher

VALVES.—An advance of approximately 10 per cent, has been recorded in the price of globe, angle and check valves, brass steam cocks, radiator valves and patent quick-opening valves Standard globe, angle and check valves are now quoted at a discount of 15 per cent. as compared with the former discount of 25 per cent. Brass steam cocks have been advanced from 20 per cent. off list to 10 per cent. off list, while the high grade is now quoted at 10 per cent. off list. Radiator valves, both standard and high grade, have been changed from 30 to 25 per cent. discount. Patent quick-opening valves are now quoted at 55 per cent. off compared with 60 per cent. formerly. Following are the discounts:

	%
Ground work	45-47
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	10
Radiator valves, standard	25
High grade	25
Patent quick opening valves	55
Basin Cocks—	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	40
Radiator valves, standard	55
Radiator valves, Jenkins disc	60
Radiator valves, quick opening	50

Steel Pipe Again Advances $4 Per Ton

WROUGHT PIPE.—Another advance of two points has been recorded in the price of wrought steel pipe which provides for an increase of $4 per ton. This increase follows one of a similar amount made three weeks ago. Manufactures are experiencing difficulty in getting supplies of coke and other raw materials, steel being one of the articles that is inclined to still higher prices. Net prices are as follows:

WROUGHT IRON PIPE PRICES

Effective March 6, 1917.

Standard Buttweld—	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 4 50	$ 6 00
¼ in.	3 78	5 91
⅜ in.	3 78	5 91
½ in.	4 93	6 50
¾ in.	6 10	8 22
1 in.	9 01	12 16
1¼ in.	12 19	16 45
1½ in.	14 58	19 66
2 in.	19 61	26 46
2½ in.	31 01	41 83
3 in.	40 55	54 70
3½ in.	50 60	67 62
4 in.	59 95	80 12
Standard Lapweld—		
2 in.	22 57	29 05
2½ in.	33 93	44 17
3 in.	44 37	57 76
3½ in.	55 20	72 22
4 in.	65 40	85 57
4½ in.	76 20	99 70
5 in.	88 80	116 20
6 in.	115 20	150 70
7 in.	152 30	196 40
8 L in.	160 00	206 30
8 in.	184 30	237 60
9 in.	220 80	284 60
10 L in.	204 80	264 00
10 in.	263 70	339 90

Prices Ontario, Quebec and Maritime Provinces.

Galvanized Sheets Increased 50 Cents

SHEETS, PLATES.—An advance of 50c per 100 pounds has been recorded in

the price of the Apollo brand galvanized sheets. There has been a firmness in this market for some weeks past, with an inclination toward higher prices. The base size of 10¾-oz. is now quoted at $8, and the prices on other gauges run as follows: No. 28, $7.70; No. 26, $7.40; Nos. 22-24, $7.25; Nos. 18-20, $7.10; No. 16, $6.95; No. 14, $6.85. Galvanized sheets are scarce in the local market, and even higher prices are anticipated in this line. Black sheets are daily getting in smaller compass, and the market is accordingly firm. Boiler plates are in firm market, and an advance has been recorded in this line.

Bushings and Unions Advance 5 Per Cent.

BUSHINGS, UNIONS.—An advance of 5 per cent. has been made in the price of malleable and cast bushings, unions, plugs and pound fittings, by the change of discount. Malleable bushings are now quoted at a discount of 45 per cent., cast bushings at 45 per cent., unions at 50, and 2½ per cent., plugs at 45 per cent., and pound fittings in Classes B and C are quoted net list. Class A in pound fittings is now quoted at 48c per pound net.

Cast Iron Fittings And Malleables Higher

SOIL PIPE, FITTINGS.—As intimated in SANITARY ENGINEER last week there was a strong probability of malleable fittings being advanced by the wholesalers, the advance having been recorded in certain quarters. Malleable fittings are now quoted by some dealers at 10 per cent. off list as compared with 15 per cent. formerly. Cast iron fittings have registered a slight advance during the time intervening since last issue, the discount being now 40 per cent. as compared with 45 per cent. formerly. Prices of malleable fittings have not been advanced in conformity with recent advance by manufacturers and it is probable higher prices may be put into effect in the near future. Prices for soil pipe have held steady during the week. Wholesalers point out that the price of pipe is low compared with the price of raw materials and that an advance by manufacturers would not come as a surprise to them. Demand for pipe is somewhat light at present.

	Discount
Medium and extra heavy soil pipe, 6-inch and under	55%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	60%
Malleable fittings	10%
Cast iron fittings	40%

Price Changes Recorded in Oakum

OAKUM.—There has been an advance of 1c per pound in the price of U. S. Navy (English) oakum which now makes the selling price 17½c. per pound. In the Clipper brand oakum there has been a decline of 1c. per pound, making the selling price now 17c. per pound. Plumbers' spun oakum held steady in price, being quoted from 8c. to 8½c. per pound. All other oakums remain unchanged. Demand has been fair and dealers anticipate there will be more inquiry in spring. On the lake front there has been the ordinary demand for repair work on boats.

	Per 100 Lbs.	
Plumbers' spun	$ 8.00	$ 8.50
Best American	20.75	21.00
U.S. Navy (American)	20.00	20.35
Clipper U.S.	17.00	....
U.S. Navy (English)	17.50	....

Old Heavy Copper Quoted Up 1½c Pound

OLD MATERIALS.—There has been an increase in the price paid by dealers for old heavy copper during the week of 1½c. per pound, now making the price offered 29½c. Advances have also been made in prices being paid by dealers of ¼c. per pound on tea lead, ¾c per pound on heavy lead pipe, 1c. per pound on red brass. The tone of the market is one of strength, however, with a good demand for materials of all kinds.

	Per lb.	
Tea lead	$ 0 06½	.....
Heavy lead pipe	0 09½	.....
Yellow brass	0 17	.....
Red brass	0 22	.....
Light brass	0 10	.....
Heavy zinc	0 09½	.....
Heavy copper	0 29½	.....
Old cast iron, per ton	16 00	.....
Stove plate, per ton	14 50	.....
Old rubbers, boots & shoes	0 08¾	.....
Overshoes, lumbermen's rubber boots	0 06½	.....
Auto tires	0 06	.....
Bicycle tires	0 03½	.....

Lead Products Are In Very Firm Market

LEAD AND ZINC PRODUCTS.—There is considerable strength in the market for lead and zinc products, due to the situation in the primary markets for the ingot metals. Pig lead is in very firm position, and spelter is going strong. The local demand for products is good, and there is a disposition to look for still higher prices in some quarters.

Lead pipe, lb.	$0 16	....
Lead waste pipe, lb.	0 17	....
Lead traps and bends	10% on list	
Lead wool, lb.	0 15	....
Lead sheets, 3 lbs. sq. ft.	0 15¾	....
Lead sheets, 3½ lbs. sq. ft.	0 15¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 15½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 34	....
Solder, strictly, lb.	0 32¼	....
Solder, commercial, lb.	0 31¾	....
Solder, wiping, lb.	0 31½	0 32
Solder, wire, lb.	0 35	....
Zinc sheets, per lb.	0 25	....

Ingot Metals Continue Firm

The general tendency of the market continues strong, due for the most part to the expectation that the United States will ultimately be drawn into the war. Copper continues strong, with prices still nominal. Tin, although higher in London, is unchanged here. Prices of tin are also nominal, the market being affected by submarine operations. Spelter and lead are firmer at unchanged quotations, while antimony is quiet and easier.

COPPER.—Copper stocks are still very light and there is good demand. Supplies are scarce, and the price is nominal at 38-39c per pound.

TIN.—Owing to submarine activity and the increased insurance rates, tin continues high in price. Stocks are light locally, and the quotations range from 53c. to 55c. pound.

SPELTER.—Supplies are scarce locally and quotations range from 13½c quoted large buyers to 16c. lb. in small lots.

LEAD.—The lead market continues firm. Prices quoted by independents at New York still range from 1½c to 2c lb. over the "Trust" price. Prices locally range from 12½c to 13c lb.

ANTIMONY.—The market is quiet but firm, with supplies scarce. The price is 35c lb.

ALUMINUM.—Aluminum is unchanged at 68c lb.

PIG IRON.—With the freight situation improving, shipments of coke and pig iron are moving more freely. If the improvement continues with no set-back, the furnaces and foundries in this district will resume more active operations. The pig iron market is still very firm and prices steadily advancing. Very little foundry iron has been obtainable from Buffalo furnaces, but what can be secured is around $37 at furnace.

SMILE

Joke with him who jostles you,
Smile on him who hurries you,
Laugh at him who pushes you,
It doesn't cost a cent!

Don't be carrying round that chip;
Wink your eye and curve your lip,
And from life's sunshine take a sip,
It doesn't cost a cent!

Don't be always first to rile
Your neighbor—give him just a smile,
It will cheer the dullest, while
It doesn't cost a cent!

—The Forge.

WANTED

A good heating and ventilating engineer. One who is at present employed preferred. Must give good references as to his commercial and engineering ability and state salary expected.

Address Moline Heat,
Moline Ill.

Canada Metal Holds Fifth Convention

Practical Addresses to Salesmen—Prizes Aggregating $1,000 Distributed—Manufacturing Processes Explained—Optimistic Regarding 1917

THE fifth annual convention of The Canada Metal Co., was held recently at the head office, Toronto. Representatives and managers were present from all parts of the Dominion.

W. G. Harris, Jr., who presided in his opening address referred to the pleasure it was each year to meet together, for not only did all become better acquainted, but from the exchange of ideas and experiences each one was able to become better acquainted and have a much wider knowledge of the lines manufactured by the firm.

During 1916 he continued, the company made greater progress than any previous year in its history and twice



W. G. HARRIS, Sr.

during the year has the Toronto factory to be enlarged until there is now five acres of floor space and every inch fully utilized and in the near future extensions will be necessary. Many difficulties were met with during 1916, but he congratulated the salesmen on the excellent results of the past year.

Practical Instructions

To give salesmen an accurate knowledge of the requirements of the plumbing business, an excellent address was given by Messrs. Rogers and Martin. Every item was laid out on the floor and shown in its particular position from the outside of the house to the cellar, kitchen, and bathroom. Every connection and fitting was on view and in its place and undoubtedly the knowledge gained by the salesmen should prove immensely valuable in the assistance the salesmen can render the plumber when making estimates.

Later, under the supervision of Mr. Harris, Jr., a tour of the various departments in the factory was made and in the lead pipe department they were shown how lead pipe was made and the hydraulic presses were at work, thus giving the visitors practical demonstrations of not only lead pipe, waste pipe, but lead traps and lead bends were also made and as the large press was also operating making special lead pipe for a large pulp mill. The visitors were given a treat to see a length of lead pipe 12 in. in diameter made; and one length 12 feet long weighed over 600 pounds.

The brass foundry was also visited and castings made of brass ferrules, brass soldering nipples, etc., etc., and later they saw the operators finishing the brass goods.

Lead wool was also made and many of the salesmen saw this made for the first time and were deeply interested and eagerly collected samples. The next department to be visited was the sheet lead factory and all rolls were operating. The pig lead was melted in the huge pots and poured into large flat molds to be cast in slabs and afterwards were rolled. Here was exhibited the various sizes of sheet lead already made and ready for shipping. One length particularly caused attraction, for it was 7 ft. 8 in. wide and fifty feet long. Of particular interest to the plumber was the rolling of sheet lead for lead flashings, 20 inches wide and 10 ft. long and any multiple of this, thus avoiding any waste in the cutting. Another interesting department which was new to most of the salesmen, as it had been installed since the 1916 convention, was the manufacture of cement laundry tubs and these were inspected from the mixing of the raw material to the final molding.

Prizes for Salesmen

In dealing with the report of the sales for the year one of the most interesting features was presenting the prizes to the salesmen who headed the lists in the various sales competitions. In 1911 a modest competition for $10 per month was suggested and inaugurated by H. C. Crow and under his supervision and guidance the competitions grew until in 1916 the value reached $1000. These competitions necessitate the keeping of most valuable records and at the end of each year reports are compiled showing in value what each salesman has sold in babbitt metals, type metals, ingot metals, solders, plumbing supplies, etc.

For general sales H. E. Cameron took first prize of $100 and D. L. Scott took the second prize of $50.

In the Harris Heavy Pressure Competition the first prize is a gold watch and chain, valued at $100. The honor of presenting same fell upon H. C. Crow. In making the presentation he pointed out that this was the most successful



W. G. HARRIS, Jr.

competition ever conducted by the company. In presenting the gold watch and chain to Mr. Cameron he congratulated him upon his success and paid tribute to the way in which he had stuck to it every minute of the time during the past year.

E. Parkin of Hamilton, who was second in the Harris Heavy Pressure Competition gave a most interesting address on Enthusiasm. This was well received, fully appreciated and loudly applauded and every one seemed to see what a fundamental asset enthusiasm is to the salesmen.

Lead and tin goods were discussed

from A to Z, and under the supervision of Mr. Harris, Jr., many metallurgical tests were made and illustrations given how raw material was first taken to the laboratory and from there to the large melting pots of 35 tons capacity. Then followed the various chemical tests illustrating the methods of testing the alloy during the melting period.

Following this came the year's report on the metal business and when the figures were given out the usual lightning calculator got up and said I have been figuring out that if we could put together all the metal goods sold in 1916 it would take several trainloads of cars to move it.

Explanation of Terms

For weeks before the convention salesmen are asked to send in questions and to illustrate how the salesmen are encouraged to educate themselves thoroughly in their lines, the following questions which were submitted may prove interesting:—

1. What do we mean by specific gravity and describe how to figure same, giving an example?
2. How to determine the Brinell hardness of metals.
3. What is the Electro-Magnetic-Method of determining the hardness of metals.
4. What is the Scleroscope?

These subjects were taken up and fully dealt with by H. C. Crow, and examples were given of how to ascertain the specific gravity of metals or any other substance which is insoluble in water.

Mr. Harris, Sr., President and founder of company was unavoidably absent



E. A. ROGERS.

at the opening of the convention but when he arrived gave an address on the duties of a salesman and his connection with the firm. He dealt in detail with the true meaning of the connection and necessity of real combination of field, office and factory. Looking at one of the signs on the wall he pointed out what a great help it would be to each one if they would dwell upon what it said, viz: "What I can do, I ought to do—What I ought to do—I will do," and to those who know the President's



H. C. CROW.

compelling personality it will readily be admitted that when he spoke of putting the punch into one's business he only advised doing what he has always done and as he declared, "It is putting the Punch there that has built up this organization."

The Convention broke up with the usual votes of thanks. In dismissing the visitors, Mr. Harris, Jr., hoped that all had derived some greater knowledge from the meeting, and that they could go out with the same conviction that he had, that 1917 would be another great year for Canada. His reasons for his conviction were:—Ontario is busy; Ontario is a producer; her factories, working to capacity, cannot keep pace with the demands; new factories are being built; new industries are being established; the whole province pulsates with the dynamic energy of tremendous commercial achievements.

Canada, it was pointed out is making colossal strides in manufacturing. To-day Canada is recognized as a factor in world commerce. Canada is now exporting at the rate of $173.00 per capita, as compared with $63.00 per capita in the United States. Canada's total exports are more than one-fifth of the United States total. Three years ago Canada had an adverse trade balance of $310.-000,000. To-day she has a favorable balance of over $367,000,000. This means that in 1913 Canada was buying abroad at the rate of $86.00 per capita and was selling at the rate of $47.00 per capita. But in 1916 Canada's sales abroad equalled $132.00 per capita, while buying remained unchanged at $86.00 per capita. Canada's net gain in foreign commerce alone in this period is over $677,000,000 or about $85.00 per capita. Ontario produces more than one-half of Canada's manufactures.

HIGH AND LOW PRESSURE STEAM HEATING

IN a recent convention of steam power plant engineers the heating question was discussed quite thoroughly, especially the value of low-pressure steam for heating industrial utensils, such as glue pots, water heaters, etc. It was stated that high-pressure steam (30 to 60 lbs.), so much used heretofore, is not necessary, and that low pressure is just as good, or even better, providing plenty of area is allowed in the pipes for moderate rate of steam flow, or plenty of heating surface is provided.

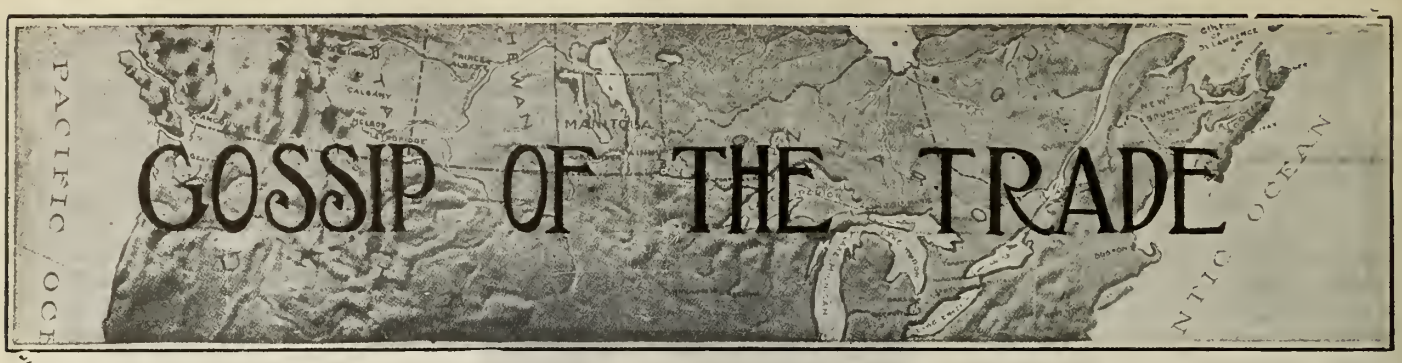
In one instance, where 60-lb. steam had been used, the pressure was reduced to 3 lbs., and, with vacuum stills, the output was actually increased. This was due to the fact that with high-pressure steam the steam blew through so fast that there was practically no time for condensation and heating. The lower pressure and lower steam velocity are ideal for stimulation of condensation.

It was further found that under high steam pressure twice as much steam was used as was absolutely necessary; the lower steam pressure reduced the amount consumed by one-half. Many



L. MARTIN.

instances were cited where, by changing the design of the heating systems—doubling the size of the jackets on the heating kettles, increasing pipe area, etc.—steam was saved to a marked degree and results were more satisfactory by using the lower pressure.



MONTREAL BRANCH ESTABLISHED

The Pease Foundry Co., Ltd., have opened a branch office in Montreal at 324 Beaver Hall Hill and have placed Mr. T. J. Carlind in charge.

Mr. Carlind enjoys considerable confidence of many members of the trade in Montreal and throughout Ontario and will no doubt make good in his new appointment.

ONTARIO SOCIETY POSTPONES CONVENTION

As we go to press we are informed that the members of the Ontario Society of Domestic Sanitary and Heating Engineers have decided to postpone their convention this year. There will be a meeting of the executive committee at a later date. Announcements with full particulars will appear in the SANITARY ENGINEER in due course.

This was to be expected to a certain extent in view of the fact that the parent society has postponed its convention.

ANNUAL CONVENTION POSTPONED—MONTREAL,

Feb. 24, 1917.

Editor THE SANITARY ENGINEER.

At a meeting held Feby. 20th the Sub-Executive of the Canadian Society of the Domestic Sanitary and Heating Engineers decided to dispense with the Annual Convention which was planned to take place in Montreal during the month of June.

The committee unanimously agreed that the present conditions existing here must prevail everywhere in Canada.

They feel each and every member of the Society throughout the length and breadth of the land is doing all in his power to bring the war to a successful issue.

Some at the firing line, and some in the home guards, others in various ways as occasions warrant.

For this reason the convention has been postponed until June, 1918, when no doubt conditions will be more favorable.

Thanking you for all the good work you have already done in the interest of the Canadian Society and the craft as a whole,

I beg to remain,

Yours very truly,

Alex. Charette
President.

C. S. of D.S. & H. E.

A TRAGEDY

Cobalt Nugget.

From the outset it was apparent to him that the case was of a most serious nature and that to treat it properly would tax all the resources of his skill. Yet, he hoped, by the judicious application of those old-fashioned remedies whose use had been hallowed by the mellowing hand of Time to avert the necessity of an operation.

So he had hot poultices prepared, and armed with these, set about his appointed task bravely. He placed them gently on the afflicted parts and tenderly caressed the wounded spots, hoping by his soothing touch to heal and restore. Minutes dragged their slow steps, and his anxious eyes, ever on the alert for a change, strained themselves for some sign of improvement.

To the waiting watcher (or the watching waiter) the great events happening in the outside world became of little moment. He did not know whether Woodrow would wallop Wilhelm, or whether Willie, Jr., had gained another "victory" at Verdun, and, for the nonce, he did not care. He was absorbed in his task and on his brow there appeared the anxious lines of care.

Time passed. There was no change apparent to his eager gaze. With a sigh he resigned himself to the worst, for—

His Water Pipes Had Frozen Up on Him.

WINNIPEG SAVES OVER $14,000, PLUMBING AND WATERWORKS DEPARTMENT

Considerable saving on their appropriations was shown by the civic waterworks and plumbing and sewers departments in statements to the Board of Conrol recently.

Of the estimated expenditure in the waterworks department for the nine months ending January of $84,295.21, the sum of $70,172.37 was expended, a saving of $14,122.84. The saving on the month of January was $735.68.

In the plumbing and sewers department for the nine months, $33,766.31 was disbursed out of an appropriation of $39,599.88, as compared with $40,803.07 for the corresponding nine months of the previous fiscal year.

The above item should be of particular interest to readers of THE SANITARY ENGINEER, because of the fact that James Smith, the chief, is and has made history in the sanitary engineering field.—Editor.

SMOKE ENDANGERS HEALTH

Dr. Hastings Says Increase in Pneumonia is Largely Due to Smoke

Toronto had 147 deaths from pneumonia in January, and to the Local Board of Health, Dr. C. J. O. Hastings, M.O.H., laid the main blame for this on the increase of the smoke nuisance in Toronto. He suggests that electric power be substituted for steam wherever possible, and where this cannot be done, special devices for more complete combustion should be installed.

Dr. Hastings says that pneumonia grows with the growth of industrial life and manufacturing. Since 1875 pneumonia deaths in infants and children increased by 600 per cent. The main growth is in the cities.

In the face of such facts every sanitary and heating engineer, when selling a heating equipment, should put forth every effort in favor of a smokeless boiler.

Such arguments as given above by Dr. Hastings are conclusive proof that every person guilty of not doing his best to eliminate the smoke nuisance.

in whatever way he can is to some extent contributing to the cause of pneumonia. It is a matter of health, and this profession is just so far falling short of their just title of Sanitary and Heating Engineers when they do not do all in their power to minimize the smoke nuisance.

INHALE DUST AND DIRT

Dangers of Industrial Work Being Lessened

Dangers of work in munition plants in Toronto were dealt with by Dr. Hastings in his report to the Board of Health recently. He has completed an industrial survey of the city, covering 1,575 industries and 82,541 employees, of whom 26,727 are females.

BOOK ON VACUUM STEAM HEATING

Messrs. Darling Brothers have a splendid book on vacuum steam heating for distribution to the trade.

It not only gives some very interesting information regarding their products, "The Webster System," but also contains some very valuable information regarding steam heating systems, which cannot fail to be appreciated by those in this line. It is a book of nearly 100 pages, highly illustrated.

Copies can be procured from any of their Canadian offices at Toronto, Montreal, Winnipeg, Halifax, St. John, N.B., London, Calgary, or Vancouver.

YOUR STREETS

To those who are interested in clean streets, well laid out lawns, etc., a book entitled "Your Streets," will prove to be good reading. The book is beautifully illustrated, and contains a mass of useful information about concrete, and what concrete will do to improve "your streets," roads and highways. It is one of those books that is showing how every progressive step can be taken advantage of, and is published in Chicago by the Portland Cement Association, 111 West Washington Street, Chicago. Those wishing to procure literature about the many uses of cement and what it is doing for humanity may be furnished with same by dropping a postcard to above address.

SANITARY CONDITIONS MUST BE BAD

The following is a clipping from the "Belleville Intelligencer" which, to those who can read between the lines, spells poor sanitary conditions in Belleville, a town of less than 10,000 people using approximately 300 gallons of water per person per day.

In normal times, the consumption per capita amounts to over 250 gallons per day.



Lt. O. A. ARMSTRONG.
Attached to 58 Batt., 3rd Div., C.E.F.

"At the Council meeting last night, Ald. Deacon, chairman of the Water Works Department, stated that on Sunday 2,800,000 gallons of water were pumped, which was an excessive amount. The citizens should remember that coal is scarce at present and hard to obtain and every user of water should exercise the greatest care. It was a fact that taps in a number of places were allowed to remain open every night to save from freezing. This practice should be stopped. We must be careful and not waste the water, which costs money to pump. The amount pumped on Sunday was 38 gallons of an increase per head of the population of this city over that used in some other cities. He would respectfully request the citizens to be as careful as possible in the using of water at the present time."

Just imagine the low standard of sanitary conditions, when it is publicly admitted that on an average, each person in Belleville is being charged for nearly 6 barrels of water per day.

For a family of 6 persons nearly 1800 gallons per day is being pumped—40½ barrels per family.

Where is our provincial health department? Where is our conservation commission?

"Where, O, where art thou economy, that thou allowest water to be pumped into the Bay of Quinte!"

The Town of Belleville is pumping twice as much per capita as the City of Toronto, and nearly 10 times as much as most towns and cities in the British Isles.

It may be a far cry, but it is nevertheless true, that wilful waste brings woeful want.



Flight Sub-Lt. FRED. C. ARMSTRONG,
On active service with 22nd Wing, R.N.C.

TORONTO FILTRATION PLANT

(Continued from page 15.)

length of the building in the centre and at the same level as the top of the filters. The gallery has stairways at each end. On the gallery are ten operating tables, five on each side, or one for each filter. The tables are made of Cecilian marble and have on the top hand wheels for operating the small valves under the table, which work the hydraulically-operated gate valves that control the filters. In connection with each hand-wheel there is a gauge for indicating the amount of opening of each valve. Behind the table are situated a loss-of-head gauge, and a venturi water meter, registering the amount of filtered water. On the west side of the space between the two rows of filters is the 72-inch raw water pipe, while on the other side is a corresponding pipe for filtered water, delivering into the inspection tank at the end of the building. Above these pipes are situated two 36-in. cast iron pipes, one above the other. The lower pipe takes water after backwashing from the overflow gutters of the filters, while the upper pipe is for back wash water and is connected to the wash water tank. There are, in this building, 50 Glenfield & Kennedy hydraulically operated valves ranging from 6 in. to 24 in. diameter.

WHEN MAN IS A FAILURE

When he has no confidence in himself or his fellowmen.

When he values a success more than character and self-respect.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters. Published—Description of Jobs Done or Shop Kinks Are Also Invited.

COILS DO NOT FILL WITH STEAM

Editor THE SANITARY ENGINEER.

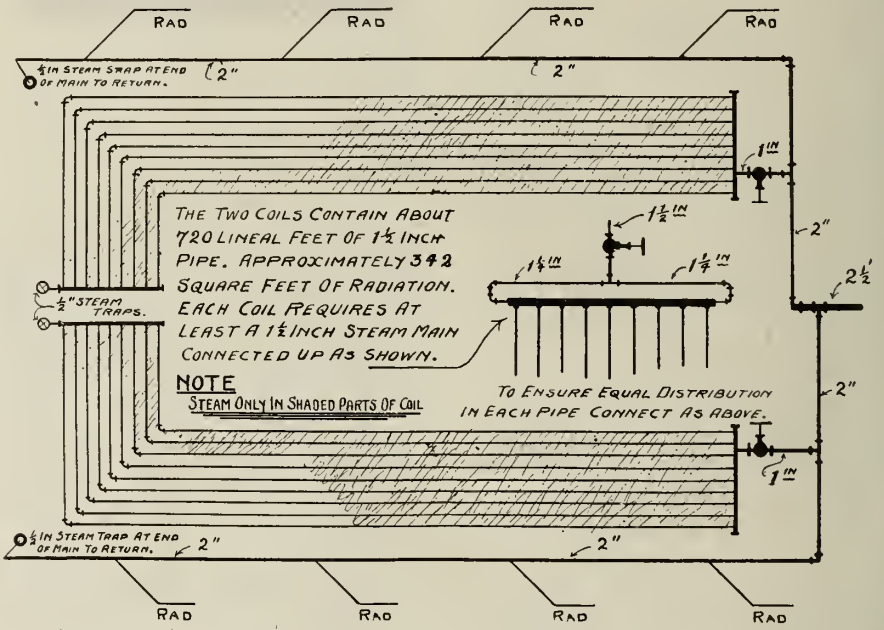
I would esteem it a favor if you could give me the reason, as soon as possible, why all the pipes in these coils (see sketch enclosed) do not fill with steam. It is a Webster system, and the coils are made up of 1½-inch pipe.

The main steam pipe is 4 inches, from which a number of radiators are fed; then a run of about 60 feet of 3-inch main, from which the 2½-inch steam line is taken. This 2½-inch main is fitted up as shown in sketch, and reduced to 2-inch; the coils are supplied with steam by 1-inch pipes and ½-inch Webster return traps in positions indicated.

There is about 500 square feet more radiation to be added to the system: the whole is fed from a high pressure boiler and reduced down to 3 lbs. per square inch.

This same boiler heats 3 to 4 times the amount given above in other parts of the building.

R. M. H., Ontario.



LAYOUT OF COILS SUBMITTED BY R.M.H STEAM DOES NOT FILL ALL THE PIPES.

In the first place, scarcely sufficient particulars are furnished to give an absolutely correct solution to the above question, such as the exact size of the boiler, the pressure carried at the boiler, and whether the 3 lbs. pressure referred to is constant. The pipes may or may not be covered—that is, the steam mains, and if not, the steam is most likely very wet.

If such be the case, the traps are none too large at the return headers on the coil.

However, assuming that the steam is dry, that the 3 lbs. pressure is constant, and that the boiler is amply large enough for the duty it has to perform, we have shown what the trouble is.

The sketch shows that the two coils contain approximately 720 lineal feet of 1½-inch pipe, and combined there is about 342 square feet of radiation, which is arrived at in this way: The circumference of a 1½ in. pipe is 5 7-10 inches; one foot is equal to 68.40 inches, multiplied this by 720 and we obtain 49,248 sq. inches, or 342 sq. feet as the amount of radiation.

Now, it will be seen that a 1-inch pipe is scarcely large enough to furnish steam to such a big amount of radiation. Then, again, when a harp mitred coil is made up with more than 5 pipes, no matter what the diameter of the pipes may be, if the length is more than 15 feet, the header should be tapped at each end, and connected in the way shown. This method ensures a more equal distribution of steam. The coils in question are 45 feet and 35 feet long respectively, and either of them are too large for a one-inch steam supply.

Therefore, assuming, as we said before, that there is sufficient steam available, the installation will no doubt give satisfaction if connected up in the manner shown.—Editor.

DOES NOT WORK WELL

Editor THE SANITARY ENGINEER:

Please find enclosed, rough sketch of some work that I have been called in to remodel. I trust that you will understand it clearly.

This job works very well when both the fires are going, but when the fire is out in the cook stove in the kitchen, there seems to be too much water for the boiler in the basement to heat. Can you tell me how I can heat the top boiler and hold the lower one in reserve?

What I want is to have the top boiler warm in the morning, with the fire out in the stove and only the furnace fire going.

I must say before I close that your paper gives me lots of valuable information and I take great pleasure in reading it.—M. K. M., Nova Scotia.

We have reproduced in Fig. 1 the sketch sent in by our correspondent, M. K. M. In the first place, it would be

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December 15, 1914



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well to explain that when a body of water is to be heated by a coil or heater, that body of water, whether boiler or radiator, must be in circuit with the medium from which the heat is to be transmitted. Care should always be taken that there is no possibility of short circuiting, or by-passing of the body of water to be heated.

Now, let us look at the connections between the coil and boiler in the basement. The pipes that project out of the furnace no doubt are horizontal with each other; that is, side by side, not one over the other as shown; the top pipe is connected alright as far as its connection to this boiler is concerned, the lower pipe, however, is not. Note the tee, which allows a pipe to be run downward, and another up. Then follow this pipe on and it will be seen that

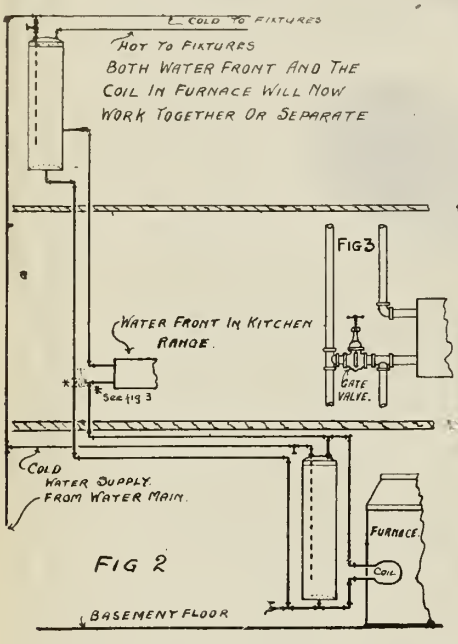


FIG 2

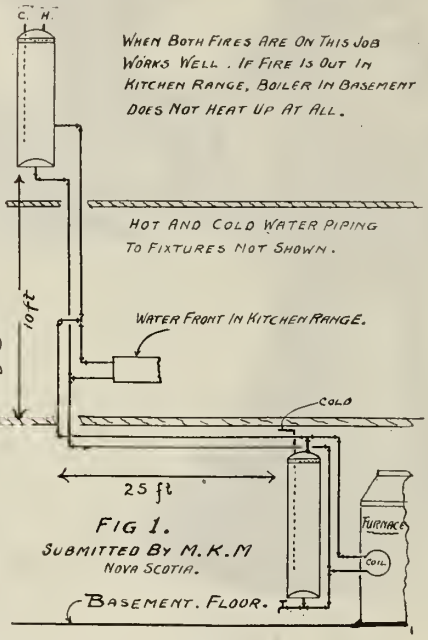


FIG 1.
SUBMITTED BY M.K.M
NOVA SCOTIA.

the basement boiler is practically not in circuit with the coil at all; the water will always flow from the top boiler down to the tee at the lower branch on furnace coil, through the coil and on again through the top pipe.

Now, turn to Fig. 2. The boiler in the basement is connected in such a way as to not only allow of it being heated well, but is also in a direct circuit with the boiler above, giving the top boiler the preference, and at the same time all water drawn off will be from the top boiler, which is what our correspondent desires. If, for instance, the water is hot in both boilers, and water is drawn from the top boiler, the water in the lower boiler being in reserve will at once begin to circulate and the cold water will be furnished evenly to each boiler.

Now, turn to the connection between the upper boiler and water front in kitchen range. It will be seen that this boiler depends very much upon the water front for heat, and when the fire goes out the work is all put upon the coil in the furnace to heat the two boilers, and very likely this coil is not large enough. That is a matter which I know nothing about because our correspondent has not given us the size of the coil, and we assume that the water front is large enough for the one boiler. It may be, and no doubt is the case, that the range only is required to heat the water in the boiler above for summer time when the furnace is not in use, and in that case other provision must be made.

Fig. 3 shows an enlarged view of a connection which should be made at the range in kitchen. It will be seen that instead of an elbow at X in Fig. 2, a tee is inserted, as well as a tee in the pipe on the lower pipe to the boiler.

Now, for summer use, the cold water valve at the top of the boiler in basement must be closed, and the valve at the kitchen range connection shown in Fig. 3 should be opened.

For winter use, the valve in Fig. 3 is closed and cold water valve in basement opened, though as a matter of fact this valve is really not necessary at all, except that in winter the one boiler would get all the cold water when hot water is drawn off.

It might be as well to say that the coil in the furnace should be sufficiently large to take care of the two boilers, which also depends upon what size the boilers are. Assuming that they are the ordinary 30-gallon size, then a coil suitable for a 60-gallon boiler should be used, because, when the kitchen range is going, the furnace fire is not likely to be as hot, and more water will be used during the daytime when the range is going; that is, of course, during the winter. In summer time the water front in the range will take care of the one boiler.

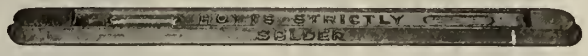
Another matter should be mentioned here, that of avoiding the use of two valves on the heating pipes between the furnace and the upper boiler. Just recently a very serious accident happened due to the fact that two valves were fitted in a way so as to cut off circulation from the lower boiler. New tenants moved into the house in the fall, and the furnace was put in to use. Not only were the two valves closed, but also the cold water supply and the furnace was wrecked, as well as other damage done.—Editor.

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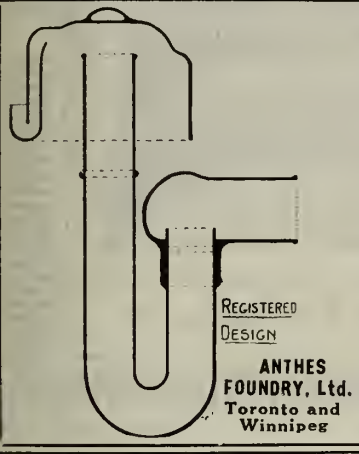
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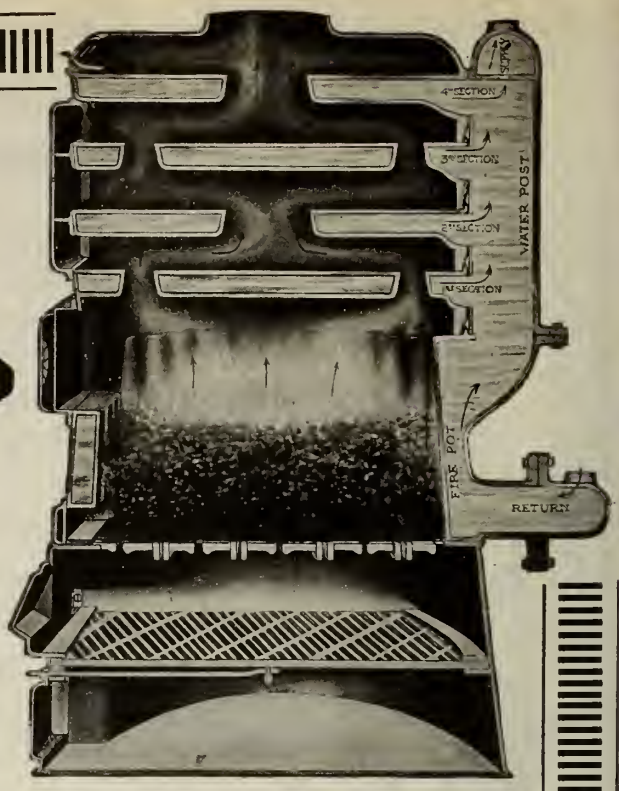
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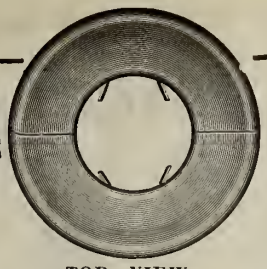
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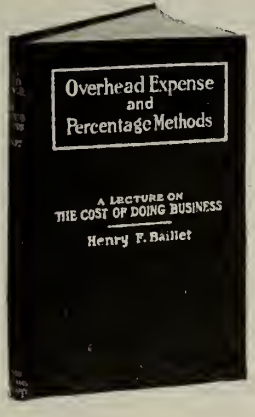
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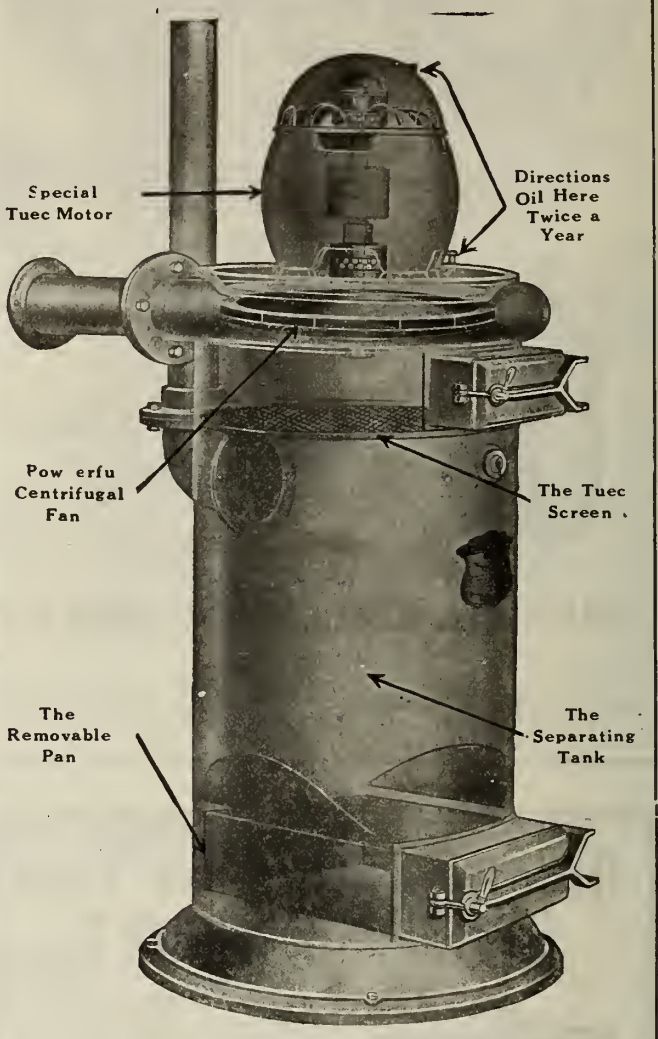
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Water Supply Systems.
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WROUGHT PIPE

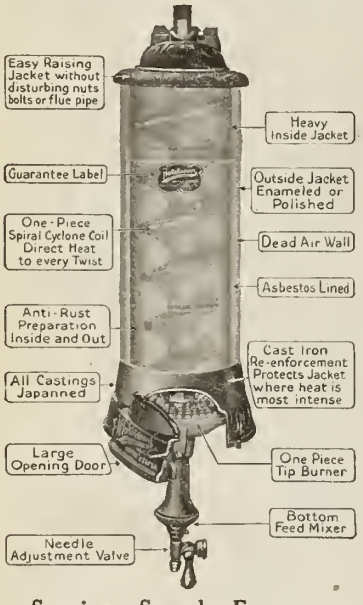
BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

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Montreal Works: Lachine, Can.

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Hotstream Heaters are built to meet YOUR CUSTOMER'S VIEWPOINT—he is the man to be ultimately satisfied!

Remember — you can't buy Creamery Butter for the price of Oleo.

Yet the price of a Hotstream is small compared to what its EXCELLENT SERVICES justify.

You owe it to your business to investigate and compare Hotstream Heaters with those you are using.

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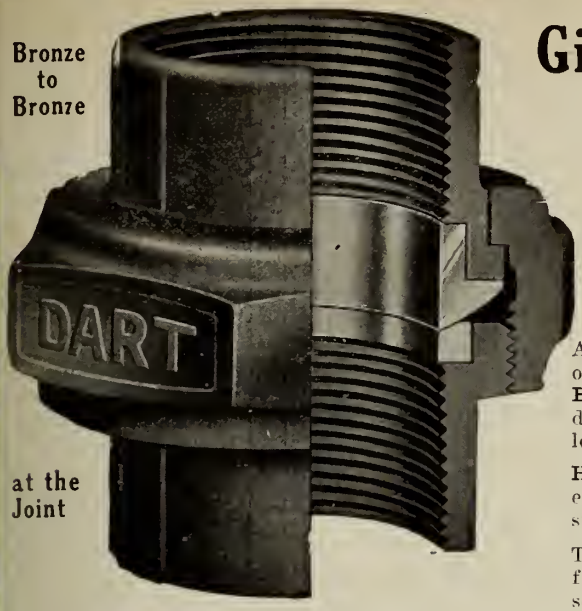
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The standard for years, and carried by the leading supply houses.
Insist on "B. & C." Plates.

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The Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.
Send for catalogue of complete line.

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3-8 in. to 4 in.



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At the joint, the vital part of the union, **Bronze meets Bronze**—there is nothing to deteriorate and cause loosening up and leaks.

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Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

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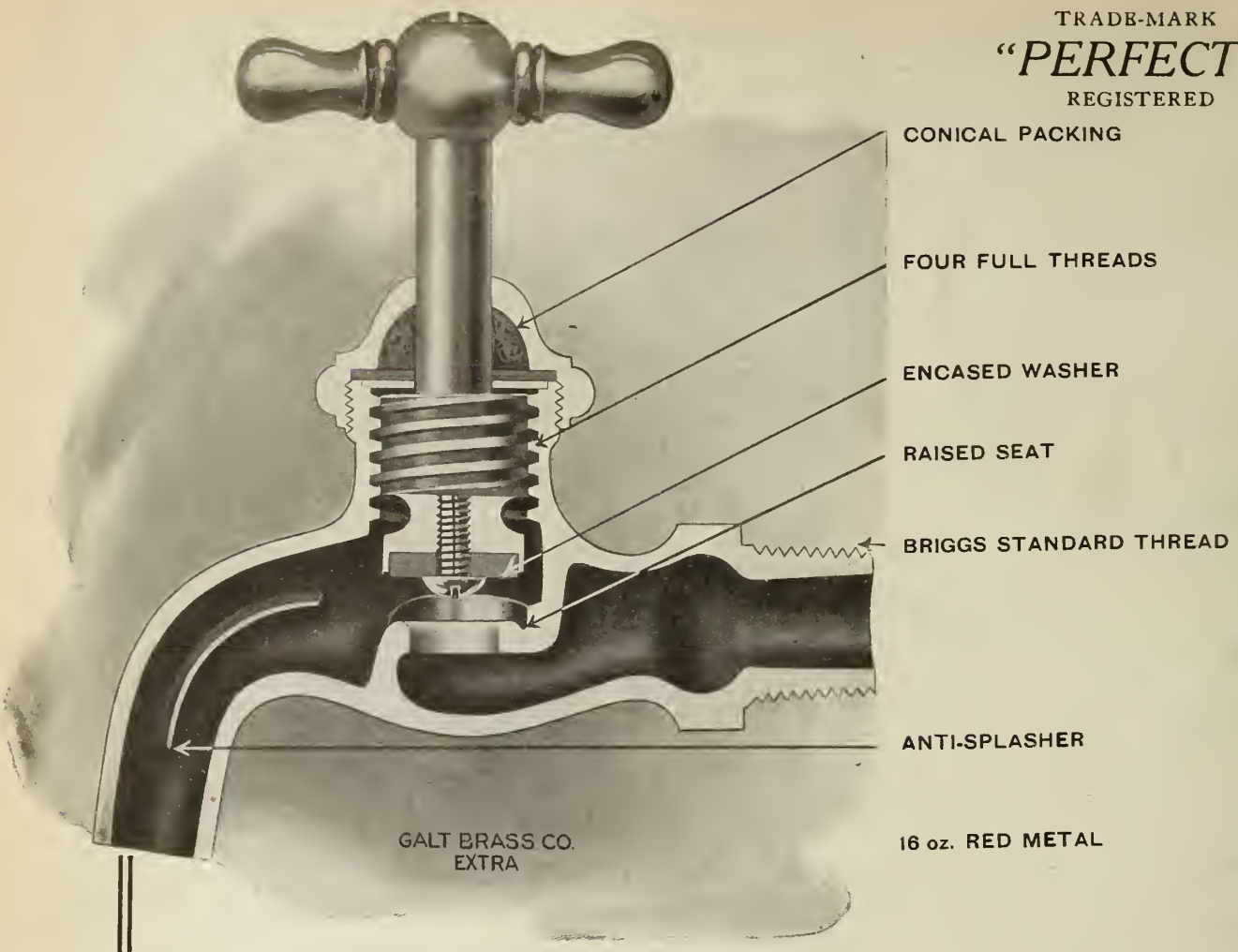


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THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, APRIL 2, 1917 | No. 7

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OLYMPIC—*Plate A15D*

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JUST ONE CUT

and all the threads are finished by using

"JARDINE" and "TOLEDO"

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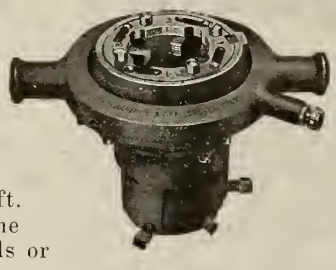
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No cams or jimcracks to get out of order. Cutters that cut, don't squeeze. A set of cutters for each size of pipe. Lead screw ensures perfect pitch and form of thread. Adjustable to variations in size of fittings. Durable cutters.

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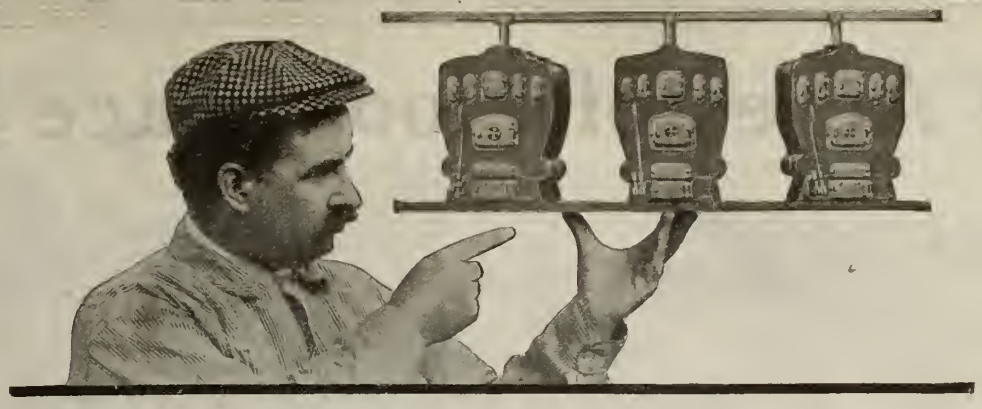
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WATER SYSTEMS

have set a new and higher standard. Letters of approval and appreciation have been received from sanitary engineers in all parts of the province. It is no longer necessary to look across the line for a *really satisfactory, pneumatic water system.* It involved a big outlay and not a little faith in the trade. But we knew that most dealers recognize *real merit* and only want fair value. And this is what you receive when you specify *AYLMER* hand and power systems.

Write to-day for Prices and Bulletin 24.

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Who doesn't ask you to Buy—
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Catalog "C"

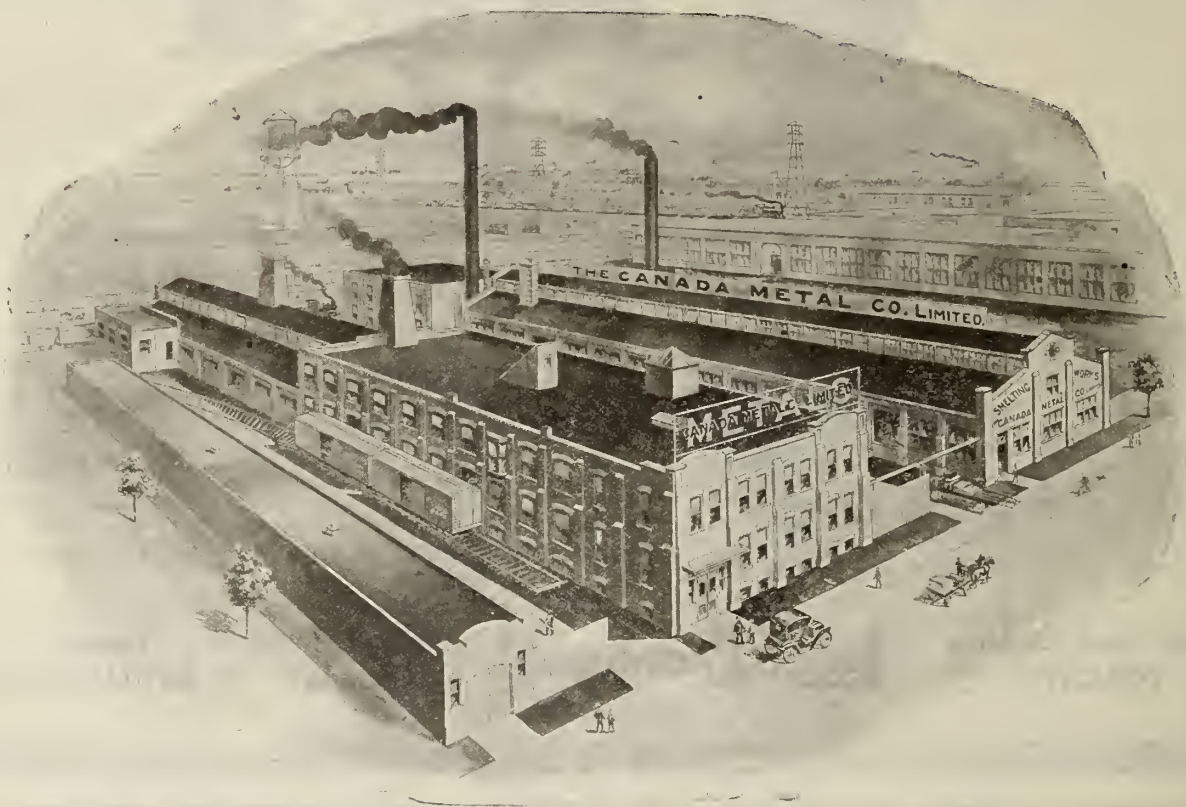
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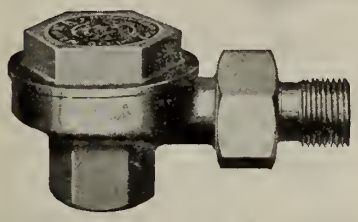
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The Dunham Vapor Heating is an application by Dunham Engineers of the principles of Dunham Vacuum Heating, famous throughout Canada for efficient heating of public buildings, offices and factories.

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C. A. DUNHAM COMPANY, LIMITED

TORONTO, CANADA

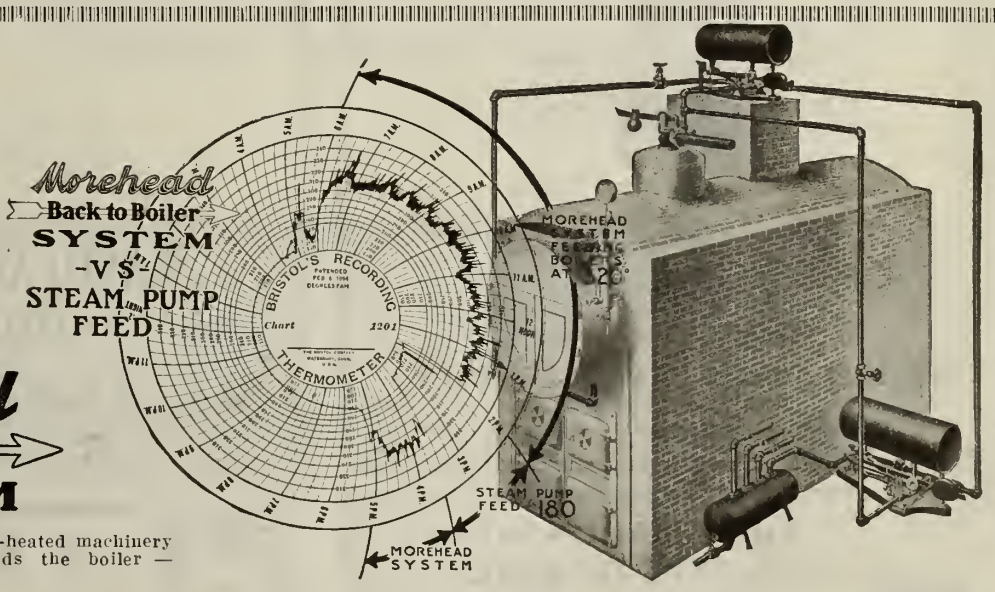
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Write us fully about your steam troubles and receive valuable advice—no obligations. Ask for catalog.

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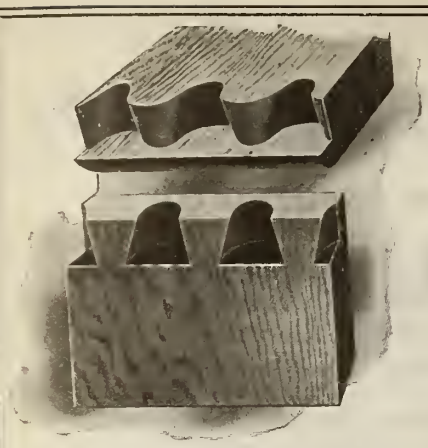
shows on the same chart the relative temperatures of steam pump and Morehead System Boiler Feeds—taken under exactly the same conditions.

Between 2 and 2.30 P.M. the steam pump was cut into the line in place of the Morehead System.

** Courtesy of Engineer Arthur Rice, Hoyt Wholesale Grocery Co., Chicago.*

Canadian Morehead Manufacturing Co.

Dept. "C" Woodstock, Ontario, Canada 401



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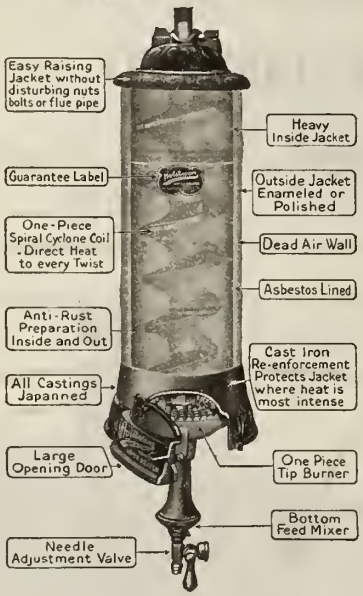
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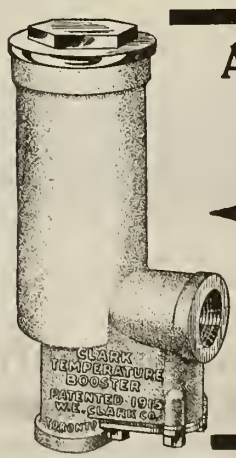
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BRUSSELS

THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, APRIL 2, 1917 No. 7

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THE SANITARY ENGINEER

VOL. XI APRIL 2, 1917 No. 7

Clay Tile Pipe vs. Cast Iron Soil Pipe

No Expense Should be Spared to Safeguard the Health of the Occupants of a Building—Experience Proves That Tile Pipe is Not the Most Desirable Kind to use—Drain Diggers and Incompetent Men Only, Advise Its Use—While Actual Practice Proves Otherwise—The Public are More Interested in Safety Than Cents

By R. O. W. Y. M. E. Roberts, Consulting Sanitary Engineer, Toronto.

THAT the discussion as to the advisability of using cast iron soil pipe in preference to clay tile pipe for drains located within the walls of a building has created a wide-spread interest is proved by the number of replies received to the letter we sent out and which appeared on page 17, March 1 issue, and again on page 12 of March 15 issue.

On the editorial pages of the March 15 issue of THE SANITARY ENGINEER, we gave all the reasons why cast iron soil pipe is best, and our reason for not advocating the use of clay tile pipe in such locations.

In one town where a new by-law is under consideration, this question received a great deal of prominence, owing to the fact that extra heavy pipe has been demanded for local drains for over 16 years, and the high cost of cast iron soil pipe has no doubt something to do with the apparent unrest over the subject. Builders as well as owners find that all building material is much more expensive, and in their earnest endeavors to reduce expenses in many cases contractors, architects and builders, are seemingly inclined to sacrifice safety to cheapness.

Now, by recommending the use of tile pipe within the walls of a building for domestic drainage, these men think they are economizing, which is false. Long years of practical experience have proved that cast iron pipe is the cheapest in the long run.

It may appear to be high in first cost, but where true economy is practised, first cost is not the chief question. It is a matter of upkeep, less depreciation, etc., that counts, and last as well as most important, that of preserving sanitary conditions in and around our buildings.

In visiting one of our western towns recently, and in conversation with a reader of THE SANITARY ENGINEER regarding this very problem, another phase of the queston was brought up—that of the need for every member of the craft to become more convinced as to the responsibility and dignity attached to this calling.

One large manufacturer in the town referred to, the name of which is for very good reasons omitted, called in one of his factory employees, a handy man, to install some work. Later on several members of his family felt sick, not seriously, but generally unwell.

The family medical adviser was called in, and finally after several months, diagnosed the cases as resulting from foul air and poor ventilation. In spite of it being winter, the windows were kept open, but little or no improvement resulted; at last a sanitary engineer was called in, and found that cellar drains had been put in, clay tile pipe at that, and no traps on the cellar drains. A sump pit had been placed just outside the building wall, and rain water leaders had been allowed to enter the sump pit, which was in direct connection with the sewers in the street, a pipe was taken from this sump pit up the side of the house and within a few feet of one of the bedroom windows occupied by one of the sick members of the family, a daughter.

This sanitary engineer was not called in to look over the drains particularly, but in a casual way was asked to repair a w.c. Finding, however, that he could detect sewer air in the cellar, he mentioned the fact, and in so doing found that several members of the family were sick.

Only a few weeks have elapsed, and every member is in a fair way for complete recovery.

Now, this is only one of many cases, and it shows that we sanitary engineers should stand on our dignity and assert ourselves more forcibly than it has been our practice to do.

When the repairs in the case referred to above had been completed, the owner questions the cost of the job, the amount of material and value of same, etc., he questioned also the amount charged for time, saying that it was only a drain digger's job.

It would be far better if such men would call their cheap jack drain digger a grave digger, which 99 times out of 100 is their true title.

But for some reason or other the majority of the members of the trade, fear to speak out, and demand their price without equivocation, and the first cost appears to be the chief trouble. However, regarding first cost, if we take the right stand and demand that clay tile pipe be installed properly, or according to the very best practice, it is very doubtful as to which would be cheaper. In fact, tile pipe would really cost more in some parts of Canada.

Misleading Statements

THE SANITARY ENGINEER believes that it should take some definite stand in this matter. We feel that we have the best interests of all concerned at heart when we advocate cast iron soil pipe for house drains, from the vertical stack to the branch at the main sewer, and we would not permit the advertising pages of the SANITARY ENGINEER to be used to mislead any one into thinking otherwise.

In this connection we were lately painfully surprised to see an article appear in our contemporary *The Plumbers' Trade Journal*, New York, by John W. Hill, Cincinnati, Ohio, and sincerely hope that the article in question accidently slipped in after escaping the editor's attention. Such articles are very apt to get into the hands of irres-

ponsible people, and be used for unworthy purposes. The article referred to contains some very illusory statements, which are beyond doubt misleading. For instance, no one has ever tried to show that clay tile pipe could be destroyed, that the material itself is indestructible has never been questioned. But, as far as being whole pipe, very few have or can be found in perfect condition, as pipes, after being in use for a short time. It must be admitted that tile pipes laid from 25 to 50 or even more years ago, have been found whole, but why? Because in those days tile pipe joints were simply made with blue clay puddle, and the vibration or even expansion and contraction of the pipe was allowed free action, and did not cause the pipe to crack. But how about the sanitary or unsanitary condition of the soil surrounding these puddle made joints? The filthy state of the ground arising therefrom, made it necessary to call for cemented joints, and from that time on tile pipes have been a failure for house drains.

We will quote a few of the most flagrantly misleading paragraphs referred to by Mr. Hill in his article entitled, "Adaptability of Vitrified Clay Pipe for Sewer Work." Mr. Hill writes: "For the house drains receiving the discharge of sewage from sanitary apparatus, kitchen sinks and bath tubs, and **from manufacturing wastes**, there is no material so well adapted as vitrified clay sewer pipe. Such pipe laid at low grade and carefully jointed will be permanent and durable for all time. The successful use of vitrified pipe from the building to the street sewer should convince any unprejudiced mind that it will be equally successful under the building from the vertical soil slack to the foundation wall"

Our readers will note the words "manufacturing wastes" no doubt, and will see plainly that by including manufacturing wastes, the writer is making his article somewhat controversial, because no one will deny that there are many industries, the waste from which would very soon eat away a metal pipe. But the leakage of such wastes, would not necessarily be injurious to the ground, or rather, these wastes would not set up bacterial action and pollute the ground.

Mr. Hill goes on to say that "the house drain is usually a straight line of pipe from the slack to the outside of the building, which, if laid of vitrified pipe and complete solid joints of 1 to 1 portland cement mortar, or with approved joint compound, will furnish the most durable line of pipe for the purpose, etc., etc.," and he followed this by other statements that sound strange to practical men.

"I have used vitrified sewer pipe for the conveyance of water under a head of 40 feet with satisfactory results, and the known resistance of such pipe to the action of acids from sewage" (he does not say domestic sewage) "or liquid wastes within and the action of acids in soils and sometimes cinder fills without, renders it, as long experience has shown, **the ideal** pipe for house drains and sewers.

"A house drain of vitrified clay pipe can be provided with short risers and caps through which to inspect the drain and remove obstructions, and the caps can be made water and air tight **under reasonable pressure** by a non-indurating joint, sufficiently loaded to prevent lifting under the required test pressure."

Then to "cap" the whole article and prove his own unfitness to judge which is the best material for house drains. Mr. Hill ends his article by saying "If there is any material equal to vitrified clay sewer pipe for house drains, I do not know of it."

The most painful part about such articles being given space in a contemporary going to the sanitary engineering profession is the fact that irresponsible people, who look at a dollar bill as if it was a 15 x 20 foot poster, and who would sacrifice anything for a cent, are apt to make capital out of such articles.

However, we hope to prove conclusively to our readers before this series of articles is concluded, that if we in Canada are to live up to the title of "sanitary engineers" in Canada, with all the responsibilities attending the title, that vitrified clay pipe is not the proper means from a sanitary standpoint, to convey domestic sewage from the sanitary fixtures in a building to a main sewer.

Such arguments should clear the air very much, and prove very valuable to many who are confronted by men who wish to use tile pipe in preference to iron.

We will again ask our readers to refer to our last issue so as to be quite clear as to the question we asked. Some of the replies to which are being continued as follows:

Here are a few from plumbing inspectors.

Prince Albert, Sask.

Question 1.—Answer—No, because clay tile pipe is much more liable to leakage. There is also a great danger of tile pipe breaking in case of settling of the building.

Question 2.—Answer—Extra heavy so as to guard against defects which might arise from causes mentioned in answer to question No. 1.

Defects of drainage under dwellings or buildings are both difficult to detect and dangerous, and are also very difficult and costly to remedy.

The small increase of initial cost of extra heavy over medium, light or tile pipe is more than justified in the results secured.

Question 3.—Answer—Cast iron soil pipe under dwellings or buildings, and carried out through the walls a distance of not less than eight feet, must be constructed; weight per lineal foot shall be as follows, according to diameter:

Diameter	lbs per foot
2 inches	4 lbs.
3 "	6 "
4 "	9 "
5 "	17 "
6 "	20 "
7 "	27 "
8 "	33½ "
10 "	45 "

(Signed) A. G. WARR,
Plumbing Inspector,
Prince Albert, Sask.

Winnipeg

Question 1.—Answer—No.

Question 2.—Answer—Yes. Medium up to 4 inches in diameter, and extra heavy over 4 inches, because of its greater stability, both in piping and jointing.

Question 3.—Answer—All drains under buildings must be of cast iron piping and must extend 8 feet beyond wall of building.

(Signed) JAS. SMITH,
Chief of plumbing, drainage and sewer department, Winnipeg.

Edmonton, Alberta.

Question 1.—Answer—No, because it too expensive on account of the protection which must be placed around it to protect it from breaking.

For self-cleansing purpose it has no equal.

Question 2.—Answer — Yes. For economical reasons and expediency and efficiency in making alterations or repairs. Both medium and extra heavy have qualities suitable for permanent buildings.

Where the internal arrangements of a building are changed repeatedly to suit new tenants, medium should be O.K., but where there is reasonable stability to internal arrangements the extra heavy pipe would prove more economical.

Question 3.—Answer—Clause 40 of our by-law reads as follows:

"All soil, vent and waste pipes, except as hereinafter specified for brass and lead branches shall be of medium or extra heavy cast iron, with caulked joints, or of wrought iron galvanized with screwed joints in which case the fittings shall be properly recessed and threaded drainage fittings.

(Signed) J. R. HUNTBACH,
City Hall, Edmonton, Sask.

(Continued on page 27)



A plant of the nature here described and illustrated embodies in its make-up and result accomplishment features of interest alike for the sanitary engineer and private citizen, no matter their community or national location; the necessity for pure water, either for consumption alone or as a food constituent being generally recognized as a public health essential.

By A. G. Webster.

ARTICLE 3.

Filter Tanks

THE filter tanks are constructed of steel plate supported by cast iron columns. In the centre of each tank is a space of 16 ft. 8 in. in diameter in which is located a 16 in. diameter by pass with a relief valve. At the top of the filter are arranged gutters for carrying off the wash water during the cleaning operation. Each tank contains about 600 cubic yards of sand, and has 30 sand cones or units with a 6 in. standpipe up the centre of each cone. For about 3 feet above the bottom of the tank these units are separated by spaces formed with steel plates and containing the extractors. On the bottom of the tank is the filtered water underdrain system consisting of 1½ in. perforated sherardized pipes laid on concrete and connected to a collector. Gravel 9 in. deep is placed on the pipes in three layers, each a different grade. The filter sand is placed on top of the gravel to a depth of 9 feet. When the filters are operating, the stationary sand cones have a slope of 60 degrees and the drifting sand cones 30 degrees to the horizontal. The cones are formed by the action of the water and drifting sand passing down through the extractors to the sand washer and up to the standpipe, the sand being deposited around the pipe at the angle of repose. The surface of the stationary sand collects the deposit in the water as it passes through to the underdrain system.

When in operation, the coagulated raw water passes from the raw water main and enters the filter partly through the sand washer and up the standpipe or through the by-pass controlled by a relief valve. From the top of the filter it passes in turn through the drifting sand, stationary sand and gravel, to the collecting system, where it flows away through the filtered water main to the inspection tank. During this time the drifting sand is passing down the extractors and through the small pipes to the sand washer, where it is cleaned and is again forced up the standpipe to the filter. This process is continuous.

About every ten days, according to the condition of the raw water, the filters have to be cleaned or back washed. The backwashing is done with filtered water from the wash water tank, which also gives the required head. The backwash water passes from a 36 in. main through the underdrain system and up through the gravel and filter bed, overflowing into the gutters, where it is carried away through a 36-inch drain pipe to the lagoon. The valves during this operation are operated very slowly so that the gravel and sand bed are not disturbed. The dirty water from the sand washer is carried away in a small pipe connected to the waste pipe.



Interior view of pumping station, showing auxiliary pumping units.

Pumping Station—Boiler House

A reserve steam plant is installed, and in connection with it are four boilers for supplying steam to the turbo-generator set in the pumping station, and also for the steam heating system. The boiler house and pumping house are in one building, but are separated by a brick division wall. The entire building

is 142 ft. by 75 ft., the boiler house part being 75 ft. long by 40 ft. wide. The latter contains four 300 horse-power, Scotch, marine type, dry back boilers, built by the International Engineering Works, Amherst, N.S. They are each 11 ft. 8 in. mean diameter, and contain 2,200 square feet of heating surface. Each boiler has two Morrison corrugated furnaces of 50 in. inside diameter. To the rear end of each corrugated furnace are riveted three plain courses aggregating 7 ft., making a total length of furnace and flue of about 15 ft. In each course is placed a Galloway tube, making six of these tubes to a boiler. These Galloway tubes are an interesting feature, tending as they do to improve materially the circulation. Each boiler has 142 tubes of 3½ inches diameter and spaced 4¾ inches between centres; also a manhole on the top of shell and one on the front head below the furnace. MacDonald shaking grates are fitted, and furnace doors are of balanced type.

In the main flue leading to the chimney is located a balanced damper controlled by a Ford damper regulator. Each boiler is equipped with the following accessories:—One 8 in. main stop valve with by-pass; two ball and lever safety valves set for 150 lbs. working pressure; also two spring type safety valves; one 12 in. steam pressure gauge; two sets of large size water gauges; one feed check valve; one blow-off valve, and one blow-off cock. In connection with the steam heating system there are two reducing valves, the final reduced pressure being two pounds. All the piping and fittings are extra heavy. The boilers, piping, valves, breeching, etc., will be covered with 85 per cent. magnesia, the latter being covered with 12 ozs. canvas, all supplied by the Philip Carey Co., Toronto. The breeching to smoke stack was built and installed by the International Engineering Works. A 12-in. steam header extends over all four boilers, and is 50 feet long. The steam line from header to the pumping station is 6 in. diameter.

The boiler feed pump was supplied by the Smart-Turner Co., Hamilton, Ont. It is a 10-6-12 in., duplex, outside packed unit fitted with pot valves. There is also installed in the boiler house a 1,000 horse-power Cochrane feed water heater which takes the returns from the heating system, steam pumps and steam lines. A Bawden vacuum pump in connection with the heating system is also installed in the boiler house.

Pump House

The pumping station is 75 feet by 102 feet, and contains the three main pumps, a steam turbo-generator set, switchboard, wash-water tank pumps, and pumps for hydraulic valve operating system. Ample space has been provided for installing equipment for other purposes in connection with water supply of the Island and city. The interior of the building is of buff brick, with white glazed brick around the walls to a height of 4 ft. 6 in. above floor line.



Inside view of filter unit before gravel or sand have been placed in position.

All the large pumps are situated along the south side of the building at a lower level than the main floor, while at the west end is a platform 5 ft. 6 in. above the main floor, around the turbo-generator set. At the rear is the switchboard gallery, 3 ft. 6 in. above the platform. The switchboard gallery is L shaped, and contains at one end the main switchboard for the mechanical filter plant and a table from which hydraulic gate valves on the main pumps are operated. At the other end of the gallery is a venturi meter recorder for recording the flow in the 72 in. pipe, and also a wash water tank level indicator. In the gallery, space has been allowed for additional switchboards, one for controlling the machinery for existing slow sand plant, and another also in connection with the old plant. These switchboards have not been installed at present, but will be at a later date. Below the gallery are the transformers, wash water pumps, accumulator pumps, and drainage pumps. The pumping station has two bays, over each of which is a 12-ton Hepburn hand-operated traveling crane. A covered passage connects the pumping station with the filter house. The 72-inch raw water main from pumps to the filters runs through this passage, and has a 72-inch venturi meter in the line.



View looking along filter gallery.

Filtration Pumps and Motors

Three 36-inch pumps are installed for pumping the raw water from the suction well to the filters, each pump having a

capacity of 36-million gallons per 24 hours against a total head of 32 feet. They are of the De Laval type, direct connected by means of a flexible coupling to a Canadian Westinghouse 325 horse-power, induction motor running at 360 r.p.m. The motors use hydro current of 2,200 volts, 3-phase, 25 cycles. The pumps were supplied through and installed by the Turbine Equipment Co., Toronto. They are single stage, double suction centrifugal units, with a guaranteed efficiency of not less than 77 per cent. The impellers are of bronze and renewable, the case and impeller rings being also of bronze. The hammered steel shaft is protected from the action of the water by bronze sleeves, and the pump casings are split on the horizontal centre line. Priming is secured by a 3-inch Penberthy ejector. Each pump is equipped with a check valve and gate valve on the discharge side. The 36-in. gate valves were supplied by Glenfield & Kennedy, Kilmarnock, Scotland, and are hydraulically operated from a control on the switchboard gallery. The discharge pipes from the pumps are connected to a main, which increases in diameter from 36 in. to 72 in., the large end being connected to the main leading to the filter house.

Turbo-Generator Set

The pump motors are operated by hydro power, and during peak load, or in the event of the power failing, the steam turbo-generator set has been installed as a reserve. This unit is of the De Laval type, and was supplied through and installed by the Turbine Equipment Co. The steam turbine is an 1,800 horse-power impulse type machine, having one velocity and twelve pressure stages. It is direct connected, through double helical reduction gears to a 1,335 k.v.a. Lancashire dynamo of 2,200 volts, 3-phase, 25 cycles, slow speed, revolving field type, with a d.c. exciter on the main shaft. The turbine operates at a speed of 3,600 r.p.m., the generator at 500 r.p.m., the gear ratio being 7.2 to 1; the gear bearings are of the three pinion type. The initial steam pressure on the turbine throttle is 135 lbs. per sq. inch, and the exhaust is into a vacuum of 1½ in. Hg. absolute. The guaranteed steam consumption is under 18 pounds per k.w.h. Under the turbine is installed a Wheeler low lever type jet condenser with centrifugal condensing water and an entrainment centrifugal air pump. Both pumps are direct connected to a 45 horse-power Lancashire a.c. motor.

The turbine is fitted with a Jahns governor acting from a pilot valve that admits steam to a piston controlling the governor valve, the latter being a balanced double-seated unit. The steam admission is controlled by throttling. There is also an emergency governor, consisting of a Schutte & Koerting trip and throttle valve, which trips at about 10 per cent. above normal speed and stops the machine. The main steam pipe to the turbine is 6 in. diameter and the exhaust to condenser is 36 in. diameter. This unit is equipped with an oiling system. A rotary pump connected to the governor spindle pumps oil from a small collecting reservoir to an overhead Burt cooling tank. The oil returns through a filter under a pressure of 5 lbs. per sq. inch to the turbine and pinion bearings, and also to the manifold containing nine nozzles which supply oil to the gear and pinions. The oil is next carried by brass piping to a small reservoir, and after being strained is pumped back to the overhead tank. The turbine and pinion bearing are water cooled, and the gear and alternator bearings are of ring oiling type. A 6 in. Cochrane steam separator is installed in the line from boiler header to turbine, and is drained into a Squires trap.

(Continued in next issue)

EMPIRE TRADE BANK PROPOSED

THE Department of Trade and Commerce Ottawa has received from the Committee on Financial Facilities for Trade appointed by the British Board of Trade, a memorandum outlining the committee's recommendations for a trade bank for the Empire. The committee contemplates a trade bank under Royal charter to fill the gap between the home banks and the British foreign banks and banking houses, and to develop facilities for inter-Imperial trade not provided by the present banking system. It is recommended that the proposed bank should have a capital of $50,000,000; should open current accounts and a credit department for those opening up business with other parts of the Empire, should inaugurate an information bureau; should become a centre for syndicate operations; should receive Government assistance and should have power to establish branches or agencies where no British or foreign bank of importance exists.



Interior view of pumping station, showing main pumping units, and generator set.

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 21.

Notes on Proportioning and Mixing Concrete for Sewage Tanks

Proportioning

In the last article there was shown pictorially what quantities of water, cement, sand and stone or gravel are required for a concrete of 1 cement to 2 sand to 4 stone mixture. If carefully mixed and placed a "leaner" mixture (one with less cement) might be employed as far as strength is concerned and as a matter of fact a 1 cement to 2½ sand to 5 stone is frequently used. However, tanks containing sewage should be water tight, and a 1:2:4 concrete properly mixed and properly placed will give a water tight wall without any waterproofing. Also for a small job the extra cost of cement is small.

To make 1 cubic yard or 27 cubic feet of concrete under average conditions there are required the quantities shown in Table I., which also shows what quantities of concrete can be made from 1 bag of cement as well as what materials are required to make 1 cubic foot of concrete.

TABLE I.

Mixture by Volume	WATER			CEMENT			SAND		STONE or GRAVEL		CONCRETE	
	gallons		cu. ft.	cu. yds.	bags		cu. ft.	cu. yds.	cu. ft.	cu. yds.	cu. ft.	cu. yds.
1 : 2 : 4	30½	or		0.18	6¾	or		0.22		0.44		0.88		1.00
	4½	or	0.72		1	or	0.875		0.45		3.50		4.00	
	1¼	or	0.18		¼	or	0.22		1.75		0.88		1.00	
1 : 2½ : 5	32	or		0.20	5½	or		0.18	0.44			0.90		1.00
	6	or	1		1	or	0.875			0.45	4.36		4.85	
	1 1-5	or	0.2		1-5	or	0.18		2.18		0.90		1.00	

The amount of concrete obtained will, of course, vary with the kind of sand and stone used. The table has been calculated on the assumption that the spaces or voids between the stone or gravel amount to 45 per cent. The less the voids the greater the volume of concrete and especially if gravel is used, it is quite probable that in some cases more concrete can be obtained than is shown in Table I, which is figured on the "safe" side.

The amount of water shown is only an approximation and given as the amount to be first tried. More or less should be added so that there is obtained a jelly-like concrete of such a consistency that a man would just about sink to his ankles if he were to step on a pile of the mixture. It might be difficult to make a drier concrete waterproof while for sewage tanks a wetter concrete takes unnecessarily long to set.

To determine without tables about how much cement, sand and stone are needed for a certain sized tank the following fairly accurate and simple rules are submitted:

Rule 1.

To find the amount of cement, sand and stone in cubic feet or cubic yards.—Increase the amount of concrete required (expressed in cubic feet or in cubic yards) by one-half. Then divide the amount so found in the desired proportions between cement, sand and stone or gravel.

Rule 2

To express the amount of cement in bags.—If the amount of concrete is small and expressed in cubic feet, then the number of cubic feet of cement found by Rule 1, can be taken also as the number of bags of cement required. If the amount of concrete is expressed in cubic yards, allow 30 bags of cement to each cubic yard of cement determined by Rule 1.

Rule 3

To find the amout of water in gallons.—If the amount of concrete required is expressed in cubic feet, try that number of gallons of water; if expressed in cubic yards multiply the number of cubic yards of concrete by 30 to get the number of gallons of water that should give about the right consistency of concrete.

For example, if 1 cubic yard of concrete is desired take 1½ cubic yards as the amount to be proportioned between cement, sand and stone. For a 1:2:4 mixture the amount of stone is then four-sevenths of 1½ cubic yards or 0.86 cubic yards (compare with Table I), two-sevenths of 1½ cubic yards or 0.43 cubic yards of sand and one-seventh or 0.22 cubic yards of cement. Since in 1 cubic yard of cement there are about 30 bags (see Rule 2), there results in this case 0.22 x 30, which equals 6.6 bags of cement. According to Rule 3, the amount of water required would be about 30 gallons. These values, it will be seen, differ but little from those in Table I, and for small jobs such as the average-sized tank are close enough for estimating the quantities required.

FORM I.

Description of Wall.		Length in feet	Width or Depth in feet	Thickness in feet	Cubic Feet	
Floor	—F.....	10½	× 5	× ½	= 26.25	
Roof	—R.....	10½	× 5	× ½	= 26.25	
Side Walls	—W1.....	10½	× 2 1/3	× ½	= 12.25	= 89.5
	—W2.....	10½	× 2 1/3	× ½	= 12.25	
End Walls	—W3.....	4	× 2 1/3	× ½	= 4.17	
	—W4.....	4	× 2 1/3	× ½	= 4.17	
Partition	—W5.....	4	× 2 1/3	× ½	= 4.17	

On page 28 of March 1st issue of THE SANITARY ENGINEER relative to an inquiry as to the size of a septic tank required in a particular case, the answer was made that the syphon chamber should be about 28 inches deep, 4 feet wide and 4½ long. Let it be assumed in this case that the settling chamber would be the same size as the syphon chamber. Then neglecting fittings, syphon, etc., the tank would appear as shown diagrammatically in Fig. 1.

If concrete be chosen as the material purpose of this article let it be assumed to be used in construction, then for the further that the floor, roof and walls of the tank are to be all made 6 inches or one-half foot thick. The thickness of walls, roof, etc., and whether re-enforcing is necessary are matters that will be discussed in a future article.

How much concrete is needed for such a tank?

Form I

Form I. shows a convenient way of estimating the number of cubic feet of concrete, which in this case is 89.5. Divide by 27 (the number of cubic feet in a cubic yard) and we get about 3.3 cubic yards of concrete required for the tank shown in Fig. 1. By Rules 1, 2 and 3 the various quantities are easily obtained. By Table I. they become (over 22) 23 bags of cement and nearly 1½ yards of sand and 3 yards of stone.

If sand and gravel should be found

naturally mixed in the right proportions then for a 1:2:4 mixture use 1 cement to 4 of sand and gravel, not 6 as is sometimes done. Two parts of sand mixed with four parts of gravel will give only about four parts of sand and gravel mixed, because the sand fills the spaces otherwise unoccupied between the pebbles of the gravel.

Mixing

Concrete may be mixed by machine or by hand but, course, for small amounts machine mixing is not to be thought of. There are many different ways of mixing by hand, all of which with care may produce good results. What is essential is that the materials shall be turned a sufficient number of times to thoroughly mix them together. Some prefer to make the cement and sand into a mortar, while others do not add the water till the final turning. Ogden and Cleveland on Practical Methods of Sewage Disposal state:—

"The cement and sand should first be thoroughly mixed while dry to an even color and then wet and tempered to a soft mortar. The broken stone or gravel, after having first been thoroughly wet should be spread evenly over the batch of mortar and the mass shoveled over at least three times to insure a thorough coating of the stones with mortar."

It is generally claimed, however, that by such a method more labor is involved than in handling the dry mixed cement and sand.

It is not practicable to prepare at one mixing all the concrete required for a sewage tank and what is known as a "two-bag batch" (2 bags of cement) is probably the most convenient way of mixing. For a two-bag batch the amounts of cement, sand and stone can be found from Table I. If an old cement barrel is available it will be found very convenient for a measuring box. Remove both top and bottom of the barrel. For a 1:2:4 concrete fill once with sand but twice to give the amount of broken stone or gravel required. Or prepare a measuring box, open top and bottom, inside dimensions 2 ft. x 3 ft. 6 in. x 11½ in. deep, the two side pieces of the box projecting both ways about a foot to form handles. Such a box will just hold loose (not packed) the amount of stone required when 2 bags of cement are used and if it is a 1:2:4 concrete that is required. When measuring the sand (also loose) the box should be only half filled. A line can be drawn around the inside of the box half-way up.

Having provided a mixing board or platform about 10 feet square, lay the measuring box above described thereon, and fill it exactly one-half full of sand. Now raise the box and empty two bags of cement and thoroughly mix together by turning over three times. Even off the mixture thus obtained, place the measuring box back on top of the mixture and fill it completely this time with stone. Remove the box and add about three-fourths the required amount of water, dashing the water over the pile as evenly as possible. Thoroughly mix the materials together, adding water to any dry spots until all the required water has been used. Three turnings should be enough, but no streaky or dry spots should show.

The above is probably the easiest way to prepare concrete in small batches but, as explained, numerous methods of getting the materials incorporated have been tried with success. Whatever the method used, when the water, sand, cement and stone or gravel are thoroughly mixed together in the proportions specified, the concrete is ready for placing in the floor, walls, etc. of the tank. The placing must be done without delay or the concrete will begin to stiffen or "set" before it reaches its proper destination.

(Continued in next issue.)

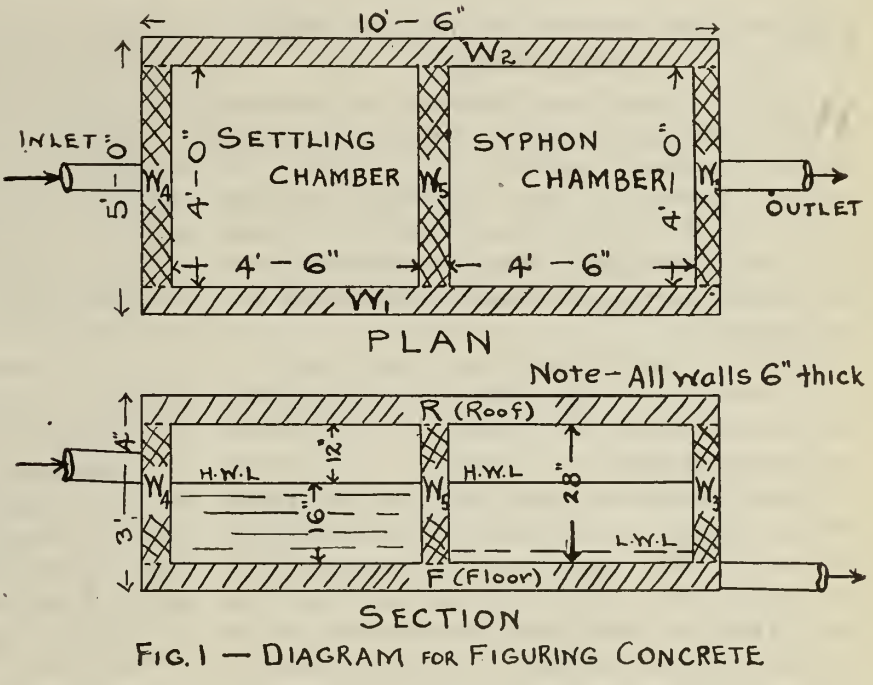


FIG. 1 — DIAGRAM FOR FIGURING CONCRETE

ANCIENT ENGINEERING

Mr. W. J. E. Binnie delivered the presidential address recently to the Institution of Sanitary Engineers, London, England, on "Sanitary Engineering in Ancient and Modern Times." The most important work in ancient times of which we had any explicit information was, he held, the water supply of Rome, and it was fortunate that there had been preserved in a Benedictine monastery near Rome a record of this work drawn up by Frontius, who held the office of Water Commissioner in Rome in 97 A.D. In reading the MSS. one could not but be struck by the similarity between the methods and thoughts of the ancient Romans and those of to-day. For 400 years from the foundation of the city the Romans were content to use the water drawn from the Tiber or from wells, but at the time of Frontius nine aqueducts had been constructed, with a gross length of about 286 miles. The largest, the Appian, which had been in existence 400 years when described by Frontius, was 61 miles in length, the springs were 900 feet above the point of delivery in Rome, and a length of about seven miles was constructed on arches or masonry superstruction. The Romans had no accurate tests for establishing the purity of water, but they judged it by its clarity. Vessels had been found which suggested the use of filters. The lecturer concluded by a comparison between the Roman reservoirs and modern constructions, the largest of which in England is that which supplies Liverpool, the aqueduct being designed to discharge 900,000,000 gallons a day.

A DAILY THOUGHT

Build for yourself a strong box,
Fashion each part with care;
When strong as your hand can make it,
Put all your troubles there,
Hide there all thoughts of your failures
And each bitter cup that you quaff;
Lock all your heartaches within it,
Then sit on the lid and laugh.

Tell no one else its contents,
Never its secrets share;
When you've dropped in your care and your worry
Keep them forever there;
Hide them from sight so completely
That the world will never dream half:
Fasten the strong box securely—
Then sit on the lid and laugh.

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APRIL 2, 1917

WHAT'S THE MATTER WITH THE TRADE ASSOCIATIONS?

WHAT'S coming up on the carpet now, I wonder, is the thought which will probably take form in our readers' minds. Just this:

For a number of years conventions have been held. They have been a failure, every one of them, or at least the last four—why? Because they have been looked upon as an annual affair instead of a daily matter.

These conventions have been more or less of a social nature, too. Too much of the "good time" element about them and not sufficient of the business stock-taking element.

These conventions have cost a lot of money. Whose money? A lot of time. Whose time? and why cost? There should never be such a thing as cost attached to conventions, neither money or time cost. Time and money put into conventions should be time and money invested, invested in a joint business, a joint enterprise, but so far it has not been the case.

In the next issue, which will be the Annual Spring Number, a general review of the work done, proposed and left undone will be made. We will show why conventions should never, under any circumstances, be postponed. We will endeavor also to show that if every member of an association would get right down to "hard pan" and do his bit, beginning with the first day after the close of one annual convention until the date set for the following convention, that postponements would not be, that progressive measures would be constantly taken for the mutual benefit of every member of the craft, whether member of a society or not.

There can be no doubt that up to the present the conventions held by the various societies have done very little good. Conditions between the manufacturers' jobbers and the trade were never in such an unsettled state. Yet there is no reason why such a state of affairs should exist. Some move will have to be made, and looking at it from the outside it is all a matter of who should and who should not be supplied with goods. If manufacturers and jobbers supply goods to the retail trade, they should be told about it in a frank, fair manner. Specific cases should be brought to their attention. Half-hearted insinuations are useless. On the other hand, if members of the trade do not look after getting business so as to enable manufacturers to dispose of their products, then the manufacturers and jobbers should put it up to the trade.

There is nothing very much to fear. Nothing was ever accomplished by one body of men being out of tune with another body, with whom they must perforce conduct business dealings. Both are members, one with the other of one big common enterprise. So it is just a case of putting into practice the words of The Master, "Come, let us reason together." Let us meet at an annual convention, let us take stock of the year's business, let us look squarely into each and every one of our shortcomings.

Now, let it be understood, that if the conventions of 1918 are to be a success, every member of these associations must start right now, do something, say something, start something. THE SANITARY ENGINEER is out to start something, to waken up the associations in some way or other, and we shall be pleased to place certain space at the disposal of any who will write us their opinions about the doings or proposed doings of the associations. No names will be published if so requested, but all letters must be signed with full address.

We would appreciate very much any comments as to the plan we have taken to rouse things up, and successfully hope to accomplish something during the coming months that will tend to result in boomer conventions for 1918.

THINGS WE SHOULD DISCUSS

AT the conventions held by the Canadian Institute of Sanitary Engineers in the years 1913-1914, some very interesting problems were discussed. A model plumbing by-law was also passed that was certainly the result of a lot of thought.

Many subjects were discussed that to-day are matters of history, and very practical at that. Now, why cannot we discuss a few of these problems taken up then in the pages of THE SANITARY ENGINEER?

There is one question that is very seldom broached and that is, who are the most practical and best fitted men to compile a plumbing by-law?

The writer has one or two proposed by-laws before him at the time of writing that have taken a lot of compiling, a lot of valuable time has been spent, but by whom? Why, by many who have only their own present and local conditions in mind. Present conditions do not in every case justify a plumbing by-law for future use, because new conditions arise. New terms, new fixtures, new methods of installation may require to be carried out under new conditions, and unless men are consulted who can and do naturally look ahead, who can provide for contingencies, by inserting certain clauses to cover new conditions, clauses that are practical, and that have been found beneficial to other towns and cities, then those plumbing by-laws may become obsolete almost before the ink is dry.

We believe this question should receive more attention than it does at our conventions, and every member of the craft should make it known to the various boards of health, town or city councils, that the craft will furnish up-to-date plumbing by-laws that are based upon every-day practical experience. If this were done no doubt city fathers would gladly avail themselves of such service, and we should then very seldom hear of an obsolete, impractical, outgrown plumbing by-law.

TILE vs. IRON DRAIN PIPES

THE articles appearing in THE SANITARY ENGINEER regarding the use of clay tile pipe for use under dwellings or buildings, have drawn some very interesting replies, and others are still arriving. It is pleasing to note the amount of interest taken in the problem.

A question regarding the subject which appears in the question box, however, puts another side to the problem, and one that of course is quite in order; the reply to the question is also given.

One reader of THE SANITARY ENGINEER informed us recently that a certain business man had refused to comply with the by-law in operation in his town, that is, he insisted upon using clay tile pipe for a stable and ice plant. This man declared that not only waste from an ice plant but also stable waste is dangerous to cast iron pipe.

To this gentleman we would reply that he is misinformed in one case and perfectly right in the other. The stable waste pipes should be of cast iron and should be separate from the drain pipes from the ice plant. Furthermore, the clay tile pipe used for the ice plant waste should be the best salt glazed, and very carefully laid. A splendid method to follow is given in the article appearing under heading "Clay Tile vs. Cast Iron," and submitted in a reply to us from W. B., West Fort William. It takes a practical man to follow out such a specification which will cost far more than any cast iron, but we are not discussing this question on a cost basis, but rather from a sanitary standpoint.

THE ANNUAL SPRING NUMBER

THE next issue will be the Annual Spring Number, and will be the very best issue ever put out of THE SANITARY ENGINEER.

There will be many new articles, and of a larger variety. We have planned to make this the best paper in every way that has ever been published in Canada in the interests of the plumbing and the heating trade, and every Canadian sanitary and heating-engineer will receive a copy of this Annual Spring Number, whether a subscriber or not.

Our reason for so doing is to let every man in the trade see for himself what is being done in his interests, because in actual fact THE SANITARY ENGINEER is of far greater value to the trade individually than it is as a revenue producer for the publisher. The only way to make THE SANITARY ENGINEER of far greater value to the trade is for every member in the trade subscribe to it. The cost is small and it is the best value published in Canada, no matter what class of paper we take.

We are convinced of the above statement because of the great number of letters of appreciation received from time to time.

But, we would like to further improve THE SANITARY ENGINEER by receiving suggestions from our readers as to how it may be made more interesting and of greater service to them. Our aim is to serve, to publish such information as will serve the greatest number of persons. We want every one of our readers to realize that a responsibility is vested in us by the fact that THE SANITARY ENGINEER is the only paper published in Canada devoted to the sanitary, heating and ventilating profession. Watch for the next issue and let us know what you think about it, and how we can improve the paper as time goes on.

VICTORIES can be won on the wheat fields of the West as well as on the battle fields of Flanders. Increased Production is a slogan of victory.

* * *

AN OUTSTANDING account is the equivalent of a loan. It is just as much yours as if you had actually paid out the money. So get your accounts in.

Our Annual Spring Number

WITH the breaking up of winter, with the opening up of spring, everything seems to take on new life and look as if refreshed by a winter's rest.

All except humanity seems to rest in winter, to bloom forth in the spring. But humanity too, if it responds to natural law, will lay plans for the Summer's work, will plow, sow and reap, and spring time is naturally a time of planning, of asking one's self what one is going to do this year.

It is with these thoughts in view that we publish a Spring Number of THE SANITARY ENGINEER, we feel that our readers will want to see what lines of new goods, or new designs are at their disposal, and where they can most advantageously buy their supplies.

The Spring Number will this year be published on April 15. Previously this special issue has been published on April 1st, but it was felt that this was a little early.

Now, the question regarding buying supplies in the sanitary and heating profession is, "Where can I get them?" Where can I buy goods that can be relied upon to stand the test of hard usage? We can answer this question by asking another.

If you saw goods displayed in a large movable warehouse that came to your door every two weeks or so, goods such as you needed from time to time and if upon each article was plainly affixed the name of the manufacturer; together with a guarantee of the manufacturer, in words such as these:

"We stand behind every piece of goods we make."

"Any article of our make proving defective through inferior metal, or improper workmanship, on our part will be replaced with two good ones at no charge to you.

If these goods were marked, *"Unconditionally guaranteed"* or *"Our goods are made to serve,"* would you not be satisfied to make your purchases at such movable warehouse? Or, would you prefer to hunt the map over to find out where you could buy goods that have no identity? We do not ask you readers to answer the questions here put to you. We know what your reply would be. At least that is if you are proud of your business, and are hoping to make a success of it.

Now, THE SANITARY ENGINEER is that warehouse, that traveling stock room, and if you do not see goods advertised on your trade paper, it proves that the manufacturer is not interested in you, it proves that he is not anxious that you should look through his stock of goods twice every month, that he is of the opinion that those readers of THE SANITARY ENGINEER, simply allow that "moving warehouse" to pass out of their establishment without being interested in the goods stocked therein. What is your opinion Mr. Reader? Ours is that of all goods you buy, you can certainly depend upon advertised goods to a greater extent than upon goods that are not advertised.

For instance. There are manufacturers who make extravagant claims for their goods, verbally, but not in THE SANITARY ENGINEER. You are so far assured that if you buy advertised goods, goods that are described in this, your exclusive technical paper you are so far protected from all manner of misrepresentation, because very few manufacturers will advertise their goods if they cannot stand the test they are liable to be put to.

And now, when you look over your Spring Number of THE SANITARY ENGINEER, that *moving warehouse with its spring clothes on,* we want you to study the stock. Then make up your mind to buy, the goods you can rely upon, the goods that are built for service, and upon quality.

Such goods will be the foundation upon which you can build up a lasting reputation. Your men will take a greater pride in their work if you give them high grade products, and your customer will get the results which can only be secured from advertised goods.

PRACTICAL SHEET-METAL WORK

THREE PIECE ELBOW WITH GUSSET OR GORE PIECE.

BY THOMAS STANFIELD

IN this article is described the method to follow in the developing of patterns for a 3-piece and 4-piece elbow.

Fig. 1 shows the plan and elevation of the 3-piece elbow, both 90 degrees, with A B the same diameter as D E.

First determine the diameter of the elbow required, as well as the length of throat. ID is to be known as the throat and EF as the heel of an elbow.

With C as centre, draw the dotted lined arc B.D., and with distance A.B. as diameter draw another arc from A to E, using C as centre.

Next divide the arc A E into four equal parts, which, seeing that the elbow is 90 degrees, will represent 22½ degrees each.

A three-piece elbow pattern is required, therefore the centre piece must represent 45 degrees and the end pieces 22½ degrees each.

It is only necessary to develop one pattern.

Now draw plan as shown, and divide it into a number of equal parts 1, 2, 3, 4, 5, 6, 7, and repeat. Then draw a stretchout line by extending line D.E., and transfer the measurements from plan to this line, and erect perpendicular lines from points on line D.D.

Next draw a number of perpendicular lines intersecting 1, 2, 3, 4, 5, 6, 7, on plan until mitre line I.F. on elevation is also intersected.

From each of the points of intersection, draw a number of horizontal lines through the perpendicular lines erected on stretchout line D.D. of pattern.

By drawing another line through each point where these horizontal and perpendicular cross, the pattern for a three-piece elbow is developed.

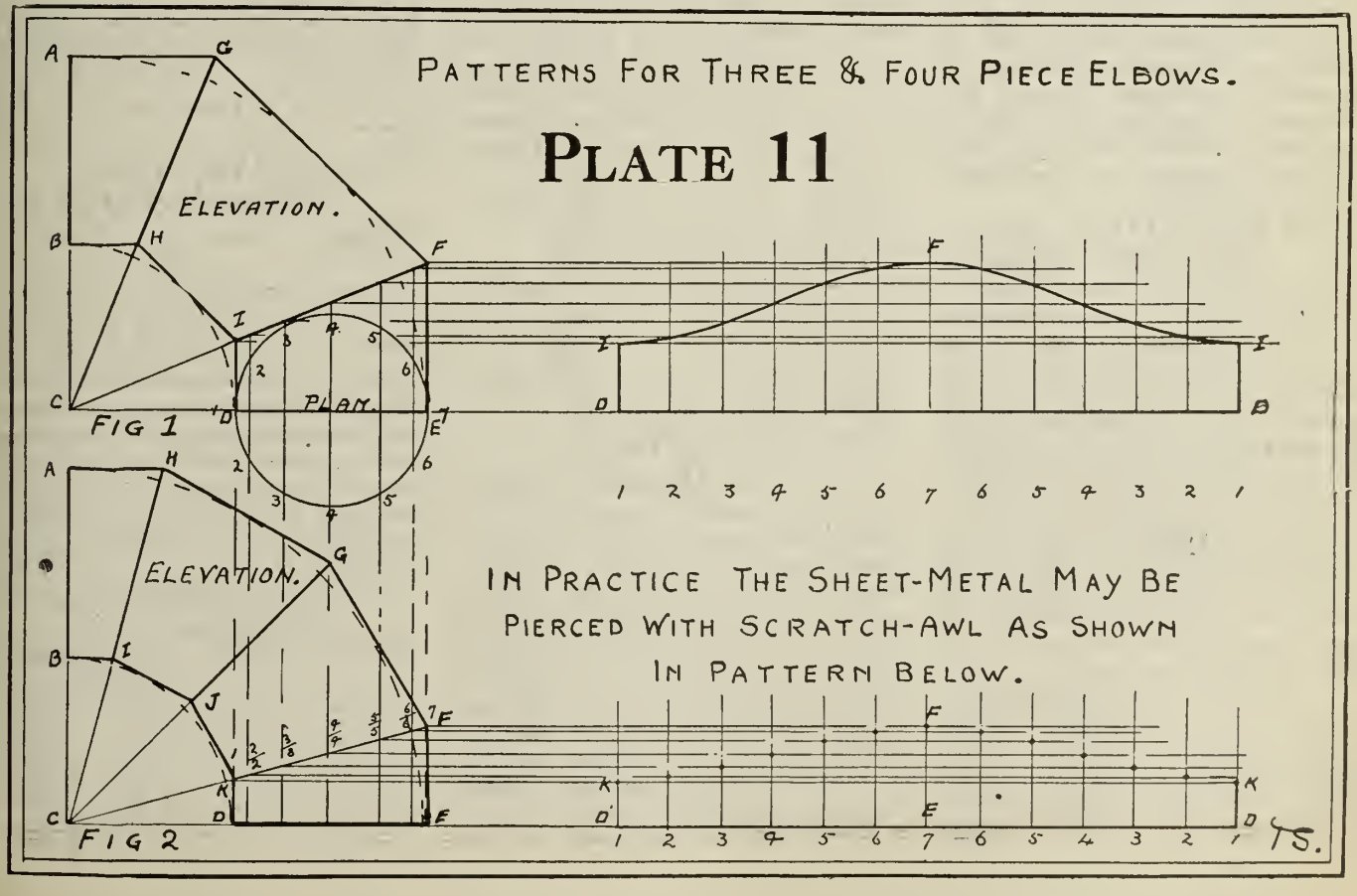
In Fig. 2 is shown the plant and elevation of a 4-piece elbow, the elevation is drawn in a very similar manner as described in Fig. 1, except that arc AE must first be divided into 6 equal parts. EF represents one part.

A four-piece 90-degree elbow is made up as follows: 2 pieces 15 degrees each, and 2 pieces 30 degrees each.

The mitre D. E. K. F. represents the mitre from which the pattern is developed.

Instead of drawing a line through points of intersection as shown in pattern of the 3-piece elbow, that is, if developing an actual pattern, the scratch-awl may be used by punching a small hole at each point of intersection. Then by taking the snips and cutting the material from K to F, and F to K, D.E.D. will represent the pattern required for a four-piece elbow.

(Continued in next issue.)



Market Conditions and Tendencies

Statements Regarding the Prices and Tr end of Supplies.

THE MARKETS AT A GLANCE

Advances in prices on lines in which the plumbing trade is interested have been numerous. There is a steadily upward trend which seems unlikely to be arrested for some time at least. Wrought iron pipe has again been advanced $4 per ton and is still in very firm market. Boiler tubes have also been moved up 10 per cent. Corrugated sheets are higher by $1 to $2 per hundred square feet. Black sheets have been moved to still higher levels and the market continues in firm position. Lead pipe and waste pipe held in steady market, but solder has been increased in price by some dealers. Pumps have made a general increase all along the line, together with repair parts and other accessories. Closet outfits have been further enhanced in value to the extent of $2 per set. Cast iron fittings is also one of the lines in which there has been a change in the upward direction. Certain makes of valves have recorded big increases. Business in plumbing lines has been fairly good, the demand coming principally through the construction of industrial plants.

TORONTO, March 30.—There is a better feeling in the plumbing trade generally caused through a good demand for supplies for new industrial plants that are now being erected. The building of dwellings is proceeding at a rather slow pace but the plants other than munition plants there is considerable activity in building. There is no hope of easier prices as yet as the cost of raw materials are all tending in the opposite direction and the price of the finished products must necessarily follow upward. Changes have been numerous since last issue and affect a number of important lines.

Boiler Tubes Have Made 10% Advance

BOILER TUBES.—Boiler tubes have made an advance of approximately 10 per cent. during the week. This advance follows a similar one recently put into effect at the Chicago and Pittsburg centres. In these columns last week it was stated there was a strong probability that these tubes would advance. There has been a good demand for both the cold drawn and lapweld tubes. On the cold drawn the increases range all the way from $2 per 100 feet to $9 on the heavier sizes. On the lapweld the increases range from $1 to $5 per 100 feet. Following are the new prices:

	Per 100 Feet Cold Drawn	Lapweld
1-inch	$24.00	$ ....
1¼-inch	30.00	....
1½-inch	32.00	25.00
1¾-inch	32.00	25.00
2-inch	35.00	26.00
2¼-inch	37.00	....
2½-inch	44.00	33.00
3-inch	47.00	38.00
3¼-inch	....	45.00
3½-inch	59.00	48.00
4-inch	74.00	60.00

Solder Has Advanced ½c to 1c Per Pound

LEAD AND ZINC PRODUCTS.—An advance of 1c per pound has been recorded in guaranteed solder, which now makes the selling price 35c per pound. Strictly solder has been advanced ½c. and is now quoted at 32¾c. Lead pipe and lead sheets have held steady during the week. There has been a good demand for lead and zinc products of all kinds.

Lead pipe, lb.	$0.16	....
Lead waste pipe, lb.	0.17	....
Lead traps and bends	10% on list	
Lead wool, lb.	0.15	....
Lead sheets, 3 lbs. sq. ft...	0.15¾	....
Lead sheets, 3½ lbs. sq. ft..	0.15¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0.15½	0.16¾
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0.35	....
Solder, strictly, lb.	0.32¾	....
Solder, commercial, lb.	0.31¾	....
Solder, wiping, lb.	0.31½	0.32
Solder, wire, lb.	0.35	....
Zinc sheets, per lb.	0.25	....

Pump Prices Have Been Moved Upward

PUMPS—Increases in the price of pumps have been made effective by the manufacturers by the change of the discounts. Where formerly the discount on pumps was 30 per cent. and 35 per cent. off list it is now 25 per cent. Cistern pumps that formerly carried a discount of 30 per cent. and 35 per cent. are also quoted at 25 per cent. Set lengths were formerly 25 per cent. off list and are now 20 per cent. Brass lined cylinders that formerly carried a discount of 25 per cent. are now quoted at 10 per cent. off list. Brass body cylinders are now quoted at net list. the former discount being 20 per cent. The manufacturers point out that although raw materials, notably brass, but including malleables, steel, pig iron and leather have been advancing so much in price, still manufacturers with certain lines have actually been able to lower the price since the war began. On one No. 2 pump, it is pointed out, that the net price before the war $4.80 while the present price is $4.60,

Closet Outfits Have Advanced $2 Per Set

ENAMELWARE, RANGE BOILERS.—There has been an advance all along the line in closet outfits of $2 per set. One of the cheapest sets that formerly sold for $19 is now quoted at $21. With vitreous china, enamel iron or white vitro tank and oak and mahogany finish are now quoted at $22.75. Bathtubs and sinks hold steady in price at the advances recorded in last issue. Range boilers are also in a steady market with prices unchanged.

30-gallon range boilers, standard	$10.50
30-gallon range boilers, extra heavy	13.00
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	25.80
Bathtubs, 5½ ft.	29.40
Sinks, roll-top, 18 x 30 in., staple	13.35
Closets	21.00

Wrought Pipe Again Advances $4 Per Ton

WROUGT PIPE.—A further advance of two points has been made in wrought iron pipe which amounts to $4 per ton. This advance is in the same amount as that recently made effective. There is a good demand for pipe, both black and galvanized, and on the heavier sizes is particularly good with some dealers. Stocks are low at present and with the firm tendency for all raw materials there is an inclination to look for still higher prices. Following are the net prices:—

WROUGHT IRON PIPE PRICES

Effective March 6, 1917.

Standard Buttweld—	Black Per 100 feet	Galvanized Per 100 feet
⅛ in.	$ 4 50	$ 6 00
¼ in.	3 78	5 91
⅜ in.	3 78	5 91
½ in.	4 93	6 50
¾ in.	6 10	8 22
1 in.	9 01	12 16
1¼ in.	12 19	16 45
1½ in.	14 58	19 66
2 in.	19 61	26 46
2½ in.	31 01	41 83

3 in.	40 55	54 70
3½ in.	50 60	67 62
4 in.	59 95	80 12
Standard Lapweld—		
2 in.	22 57	29 05
2½ in.	33 93	44 17
3 in.	44 37	57 76
3½ in.	55 20	72 22
4 in.	65 40	85 57
4½ in.	76 20	99 70
5 in.	88 80	116 20
6 in.	115 20	150 70
7 in.	152 30	196 40
8 L in.	160 00	206 30
8 in.	184 30	237 60
9 in.	220 80	284 60
10 L in.	204 80	264 00
10 in.	263 70	339 90

Prices Ontario, Quebec and Maritime Provinces.

Oakum Prices Hold in Steady Market

OAKUM.—There has been a steady market for oakum during the week with an inclination toward higher levels on plumbers' spun in certain quarters. For the most part prices remain unchanged but oakum in bales is quoted up to 9c. per pound. There has been a fair demand for this commodity.

	Per 100 Lbs.	
Plumbers' spun	$ 8.00	$ 9.00
Best American	20.75	21.00
U.S. Navy (American)	20.00	20.35
Clipper U.S.	17.00	....
U.S. Navy (English)	17.50	....

Cast Iron Fittings Again Move Higher

SOIL PIPE, FITTINGS.—A further advance has been recorded in the price of cast iron fittings, now being quoted at 35 and 5 per cent. off list as compared with 40 per cent. formerly. It was intimated in these columns in our last issue that the market for these was in a strong position and that further advances were not improbable. Soil pipe and malleable fittings remain unchanged.

	Discount
Medium and extra heavy soil pipe, 6-inch and under	55%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	60%
Malleable fittings	10%
Cast iron fittings	35 and 5%

Valves Have Made Considerable Increase

VALVES.—Material advances have been made by some dealers in valves of all kinds—globe, angle and check and radiator valves. Where formerly the discount on globe, angle and check valves was 40 per cent. it is now 30 per cent. Standard radiator valves are also quoted at 30 per cent., the former discount being 55 per cent. Radiator valves with Jenkins disc are now 30 per cent. off list as compared with 60 per cent. formerly. Quick opening radiator valves are now 30 per cent. Other manufacturers quote at different discounts from the above, the difference being due, it is stated, to a difference in the valve. Both sets of quotations are given below and accounts for the apparent difference in the same lines.

	%
Ground work	39-53
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	10
Radiator valves, standard	25
High grade	25
Patent quick opening valves	55
Basin Cocks—	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	30

Old Cast Iron Is $2 Per Ton Higher

OLD MATERIALS.—There has been an advance of $2 per ton in the price which dealers are willing to pay for old cast iron, now making the quotation $18 per ton as compared with the former quotation of $16. There has been a good demand for this commodity, as there has also been a good demand for all old materials. Prices for other lines of old material have held steady during the week.

	Per lb.	
Tea lead	$ 0 06½	.....
Heavy lead pipe	0 09½	.....
Yellow brass	0 17	.....
Red brass	0 22	.....
Light brass	0 10	.....
Heavy zinc	0 09½	.....
Heavy copper	0 29½	.....
Old cast iron, per ton	18 00	.....
Stove plate, per ton	14 50	.....
Old rubbers, boots & shoes	0 08¾	.....
Overshoes, lumbermen's rubber boots	0 06½	.....
Auto tires	0 06	.....
Bicycle tires	0 03½	.....

Pig Iron is In Very Strong Market

INGOT METALS.—The demand for all ingot metals continues good, and prices have held firm at the quotations of last week.

COPPER.—An interesting feature in the market has been the purchase of 45,500,000 pounds by the U. S. Government at a shade better than 16½c a pound. Although this is about 20c lower than the market, prices have not as yet declined, but the tone is a little easier. The amount of copper involved, however, is not very important compared with the annual production, although further transactions on the same basis might probably materially affect the market. The effect so far has been to cause consumers to hesitate in placing orders. Local quotations are unchanged and nominal at 39-40c lb.

TIN.—Additional strength has developed in the market as a result of higher prices in London. The demand, however, has been light, and New York prices are still nominal. Local prices unchanged at 55c-57c lb.

LEAD.—Prices are steady at last week's reduced quotations. The "Trust" price of 9c New York is still held, with independents ½c to ¾c higher. Local quotations are still 12c to 13c lb.

SPELTER.—Stocks are light in the face of a good demand. Prices locally range from 13c to 15c lb.

ANTIMONY.—There continues to be a scarcity of antimony, with very little metal offering. The market is quiet, with quotations nominal and unchanged at 35c per pound.

ALUMINUM.—The market is strong, but demand is light. Quotations are unchanged at 68c per pound.

PIG IRON.—The market continues very strong, with urgent demand for all deliveries. Prices continue to advance in the U. S., affecting practically all grades of pig iron. At Buffalo, lower grade foundry irons are being quoted at $39, furnace, and higher silicon grade, $40 furnace. Domestic pig iron is still quoted at $43, but an advance may be looked for shortly.

Heavier Gauges of Corrugated Sheets Up

CORRUGATED SHEETS.—An increase of $1 to $2 per 100 square feet has been made effective in the price of corrugated sheets in the heavier gauges. No. 28 gauge is still quoted at $6.50 and No. 26 at $7. On No. 24 gauge the price has been increased from $10 to $11, on No. 22 gauge from $12 to $13.25, on No. 20 gauge from $14 to $15.50 and on No. 18 to $20. Painted corrugated sheets have also been increased and quotations are now as given below:

	Per 100 Sq. Feet Galvanized	Painted
No. 28 gauge	$ 6.50	$ 5.50
No. 26 gauge	7.00	6.25
No. 24 gauge	11.00	8.50
No. 22 gauge	12.25	10.50
No. 20 gauge	15.50	13.00
No. 18 gauge	20.00	16.50

Black Sheets Again Increased In Price

SHEETS, PLATES.—A further advance of 10c to 25c per hundred pounds has been recorded in the price of black sheets. In some instances the base size of No. 10 gauge is now quoted at $6.40 while in others they are quoted at $6.50. For the base size of No. 28 gauge the price is quoted at $6.75. Following are the prices on black sheets:

	Per 100 lbs.	
No. 10 gauge, base	$6.40	$6.50
No. 28 gauge, base	6.75	6.75
¼-inch (boiler plates)	6.50	6.50

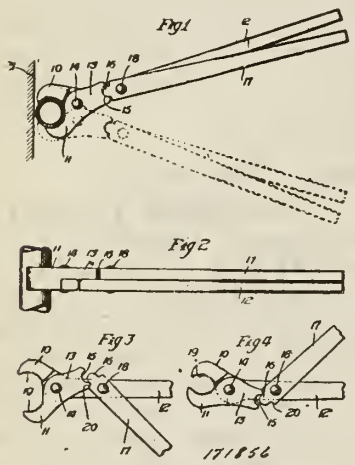
Differentials for other gauges: No. 12 gauge 10c higher than No. 10; No. 14 gauge 20c less than No. 10; No. 16 gauge 10c less than No. 10; Nos. 18-20 gauges 5c less than No. 10; Nos. 22-24 gauges same as No. 10; No. 26 gauge is 10c less than No. 28.

New Canadian Patents

No. 171.856.

John La Rock, Chicago, Illinois, U.S.A. 12th September, 1916; 6 years. Filed 26th May, 1916. Receipt No. 265,980.

Claim.—1. A pipe wrench comprising two jaws adapted to embrace a pipe and formed with curved gripping surfaces concentric to the axis of the pipe, said jaws embracing but slightly more than half the circumference of the pipe, a hand lever formed integral with one of said jaws to which the other jaw is pivoted closely adjacent to said gripping surfaces, said latter jaw being provided with a rearwardly extending portion or tail piece provided with a rearwardly opening notch having a concave bottom, and a second hand lever pivoted



No. 171,856. Pipe Wrench.

to said first hand lever and provided at its end closely adjacent to said latter pivot with a projection having a convex end adapted for rolling contact with the concave bottom of said notch.

2. A pipe wrench comprising two jaws adapted to embrace a pipe and formed with curved gripping surfaces concentric to the axis of said pipe, said jaws embracing but slightly more than half the circumference of the pipe, a hand lever formed integral with one of said jaws to which the other jaw, is pivoted closely adjacent to said gripping surfaces, said latter jaw being provided with a rearwardly extending portion or tail piece provided with a rearwardly opening notch having a concave bottom, and a second hand lever pivoted to said first hand lever and provided at its end closely adjacent to said latter pivot with a projection having a convex and adapted for rolling contact with the concave bottom of said notch, said second hand lever being pivoted to swing across the first hand lever and provided at the sides of its convex end with shoulders to engage shoulders on the tail piece at the sides of said notch, for the purpose set forth.

3. A pipe wrench comprising two hand levers pivoted one to the other, a jaw adjustably fixed to one hand lever with means to lock it in adjusted position, and a second jaw pivoted to said hand lever and connected to the other hand lever by means to produce a compound lever effect on the latter jaw.

4. A pipe wrench comprising a hand lever provided at one end with a normally fixed jaw a short lever pivoted to the hand lever and provided with a jaw mating with the fixed jaw, a second hand lever pivoted to the first hand lever and connected to the short jaw lever by means producing a compound lever effect to close the jaws upon a pipe, and means whereby the normally fixed jaw may be adjusted on its lever towards and from the other jaw and locked in adjusted position.

5. A pipe wrench comprising a hand lever provided at one end with a normally fixed jaw, a short lever pivoted to the hand lever and provided with a jaw mating with the fixed jaw, a second lever pivoted to the first hand lever and connected to the short jaw lever by means producing a compound lever effect to close the jaws upon a pipe, said normally fixed jaw being pivoted to the first lever and provided with spaced notches to receive an adjusting device, and an adjusting device detachably fixed to the latter hand lever and adapted to separately engage said notches.

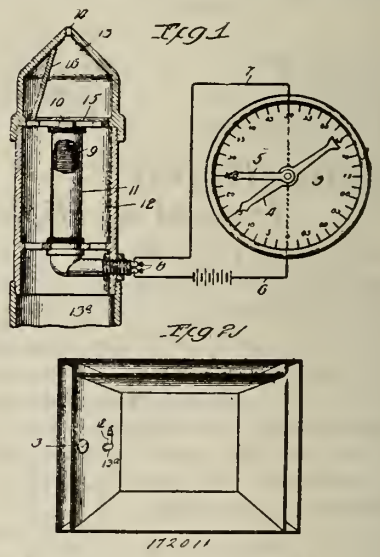
6. A pipe wrench comprising mating jaws, hand levers to manipulate the same, said jaws having curved gripping surfaces to concentrically grasp a pipe, and adjusting means for one of said jaws to adjust the jaws to concentrically grasp pipes of two or more different diameters.

No. 172,011.

The Reliance Drying Room Company, assignee of Gray I. Morriss, both of Chicago, Illinois, U.S.A., 19th September, 1916; 6 years. Filed 7th January, 1916. Receipt No. 259,657.

Claim.—1. In a humidity controlling apparatus, the combination of a humidity gauge provided with manually adjustable means adapted to be moved to indicate the desired degree of humidity, and means responsive to changes in humidity, circuit wires connecting with each of said means and adapted to establish different circuit conditions when said means are in and out of positions of coincidence, a pipe for admitting a humidifying agent to the space under control, an electro-magnet located in said pipe and connected with said circuit wires and adapted to be energized and de-energized by the making and breaking of a current therethrough, and a valve in said pipe adapted to be moved by said magnet to regulate the flow of the humidifying agent through said pipe, substantially as described.

2. In a humidity controlling apparatus, the combination of a humidity gauge

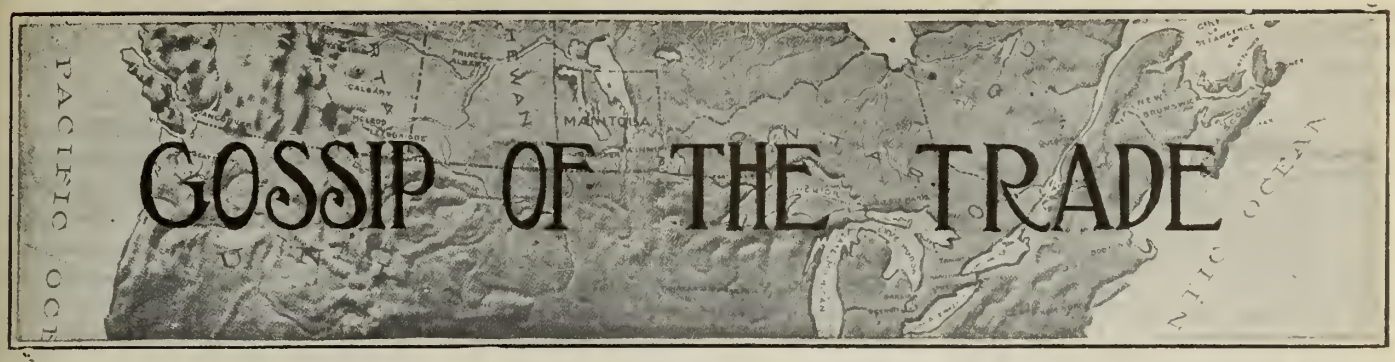


No. 172,011. Humidity Controlling Mechanism.

provided with a manually adjustable pointer adapted to be moved to a position to indicate the desired degree of humidity, and a pointer responsive to changes in humidity, circuit wires connected with each of said pointers and adapted to afford a closed circuit when said pointers are in a position of coincidence, an electro-magnet connected with said circuit wires and adapted to be energized by the closing of said circuit, a pipe within which the magnet is located and adapted to admit a humidifying agent to the space under control, and a flap valve adapted to be drawn to closed position when the magnet is energized, and adapted to be thrown back to open position under the pressure of the humidifying agent when the magnet is de-energized, substantially as described.

3. In a humidity controlling apparatus, the combination of a humidity gauge

(Continued on page 28)



RETURNED HOME

W. H. Cunningham, Toronto, has returned home from a trip through the United States. It is understood that he has secured the Canadian agency for several new lines to be introduced shortly to the Canadian trade.

FIRE AT LONDON

The London Engine Supply Co. suffered a severe loss by fire on Friday, March 16th. The show room was much damaged by water. This, however, is now under alterations, and a beautiful and more up-to-date show room will very soon be at the services of the London trade. Our worthy friend Charlie Child is at the helm, and takes a great deal of interest in his show room.

APPOINTS CONSULTING ENGINEER

R. O. Wynne-Roberts, C.E., who recently became associated with Frank Barber, also C.E., has recently been appointed consulting engineer to the Water and Light Commissioners of Sault Ste. Marie, to report on several water schemes for that city. The first installation will be about 5,000,000 gallons per day.

Mr. Wynne-Roberts has contributed several very valuable articles to THE SANITARY ENGINEER. An article from his pen appears on another page regarding tile versus cast iron soil pipe under dwellings, and will be of interest to all our readers.

WINNIPEG PLUMBING DEPARTMENT REPORT

The following table shows the work done by the sanitary engineering and plumbing department of the City of Winnipeg. It will be evident from the very nature of the work referred to that such work is a vital necessity.

Just imagine what life in a city would be if such work were left undone. It is only by giving a little thought to such matters that we realize their importance. One of the greatest troubles we experience in city life is caused by the sins of omission—not doing the right thing in the right way at the right time. But if our city fathers will just think a little less of the conservation of wealth at the expense of health, this big country of ours will grow, and will take such strides in a few years as never before in the history of the Dominion.

PLUMBING DIVISION.

Permits Issued.

	Jan.	Feb.
Plumbing	41	27

INSPECTIONS.

	Jan.	Feb.
Water tests	30	21
Smoke tests	60	50
Subsequent inspections	175	85
Miscellaneous inspections	23	20
Defects rectified	109	82

SEWER DIVISION.

Permits Issued.

	Jan.	Feb.
Permits issued	3	3
Connections constructed	2	3
Inspections	45	38

FLUSHINGS.

Gallons.

	Jan.	Feb.
Tank flushings	1,507,584	1,312,512
Hose flushing	1,176,875	1,161,000
Totals	2,684,459	2,473,512

INSANITARY CONDITIONS IN HAMILTON

The Hamilton Building Trades Council held an important meeting recently, and Secretary Robert Towler states the session was well attended by affiliated union delegates. The electrical workers' union reported that another East King street contractor had signed up, and things were prosperous. Plumber delegates said all was well with that body and that a three-year agreement had been made with a substantial increase in wages. Delegates complained that sanitary conveniences in many dwelling houses were not properly attended to and the secretary was instructed to impart this information to Building Inspector Whitlock, giving him addresses.

"This is still another proof that every town should employ a number of practical plumbing inspectors, and demand annual inspection of all plumbing. The public are paying twice the cost of such a scheme by having work done in a poor manner by cheap-jacks, and other irresponsible men who do repair work at night or otherwise "on the side."

ANOTHER CHAMPION FOR THE MAIN HOUSE TRAP AND BREATHER

Editor THE SANITARY ENGINEER:

I fully agree with John Wright, Esq., in his judgment on the main house trap.

If house traps are omitted the infected sewer air may escape into the building and may be a means of contagion. Independent of this, however, remains the fact that sewer gas from the mains is more poisonous than ordinary drain air, and a leak of sewer gas will vitiate the air in a building considerably more than ordinary drain air from the same leak. Besides, sewer gas is more corrosive than drain air on the metals of which a drainage system is composed.

The main drain trap should be placed as close to the wall where the drain enters the building as circumstances permit. It should be the second fitting placed on the house drain inside the cellar wall and should be made of some strong metallic substance. Tile or earthenware traps should never be used inside a building.

LEO. G. GREENAWAY,
Bowmanville, Ont.

BURLINGTON'S LIVELY TIMES

Our neighboring town of Burlington is in the throes of a wild and woolly conflict as to whether the inside piping for sewer connections shall be glazed tile or iron pipe. Already there have been several violently stormy meetings of the council that ended in disorder.

Each side has held a public meeting at one of which loving cups were not distributed. The whole burg is divided. One suggestion is that Mayor Ghent and Coun. Hughes Cleaver both resign and contest the mayoralty as leaders of the opposing sides. Another is that the whole council resign.

An entirely new set of rules of procedure has been adopted by the new council in an attempt to have order and make progress with the town's business.

The climax was reached on Friday evening last when there was a champion wrangling match in which the ratepayers present could not refrain from joining. Finally the mayor was compelled to

call the police to prevent blows being struck. Fortunately a hurried adjournment avoided a prospective encounter, as closed fists were numerous.—Oakville Star.

BRISK IN WINDSOR

The sanitary and heating trade in Windsor are experiencing good times. The erection of several hundred houses is at present under consideration. Contracts have been let for the plumbing and heating, and the only probable drawback is a scarcity of labor. With material at such sky-high prices, buildings will be much more costly. These conditions, it was felt, would prevent building to any great extent, but the outlook in Windsor certainly is very favorable. Many other large buildings are going up, and the town has every appearance of a busy season ahead.

CHATHAM'S BUSINESS OUTLOOK

No town in Western Ontario has a brighter outlook than Chatham. Buildings are under way already. The sanitary and heating business is in a fair way towards a small boom. Scarcity of labor will be one drawback, though other evils may also be looked forward to. In spite of the fact that there are many very wealthy manufacturers there, sanitary conditions are filthy. Chatham is living in a fool's paradise. No plumbing by-law; any handy man is permitted to install drains and branch sewers, and those who can pay for good work look upon the sanitary engineer as an impostor until sickness strikes down members of families.

We have it on the best authority that one very wealthy man got some of his own employees to put in drains under his residence, and under some pretext called in a local sanitary engineer to make a very trivial repair. Finding that sickness was in the house, the sanitary engineer made a further examination of the plumbing and found that there were open sewer connections and a sump pit directly in line with open windows. After the whole job was put into a sanitary condition, the price was sneered at, and the sanitary engineer looked upon as a thief or little better. Such is the state of affairs in Chatham. So, unless something very radical is done, and a plumbing by-law governing both the plumber and his work put into force, Chatham will very soon suffer the penalty that visited Old London and that laid Rome low, with none but their own health department and the careless rich to blame.

A SPLENDID EXAMPLE

There are many persons in this world who think that plumbers are all of a class that fall short of being good, progressive, and public-spirited citizens. Such, however, can not be said of the sanitary and heating engineers in London.

Jimmy Haslett is still the instructor in sanitary science at the London "Tech," and is doing his bit to make the boys "coming up" more efficient craftsmen, so that the London public in the days to come will be better served.

Ben Noble is in harness as a member of the Library Board; this may be a surprise to some, but who can tell what the true qualifications are that lay hidden under that honest, rugged hide of Ben's?

E. H. Russell, the good old plodder, is also on guard in the capacity of a member of London's Board of Health, and if he could only get an innings, we would have the pleasant surprise of hearing that London had at last put a plumbing by-law into operation. It seems too bad that London's citizens as a whole do not appear to realize the good that would result in having a practical plumbing by-law in force, and enforced by a practical plumbing inspector. There is great hope, however, that good will come out of the work done by our three worthy members of the craft—Messrs. Russell, Noble and Haslett.

BILL NO. 109

First Reading, March 7, 1917, of an Act to Amend the Public Health Act

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

Rev. Stat. c. 218, s. 14, Amended

1. Section 14 of the Public Health Act is amended by inserting the following as subsection 1a:—

In Cities of 200,000 or Over

1a. In a city having a population of 200,000 or over according to the enumeration of the assessors for the last preceding year, the local board shall consist of the mayor, one controller to be nominated by the Board of Control, and one alderman from each of the several wards of the city to be appointed annually by the Council at its first meeting in every year.

Rev. Stat. c. 218, s. 14 (2) Amended

2. Subsection (2) of section 14 of said Act is amended by inserting at the commencement thereof the following words: "Subject to the provisions of subsection 1a."

Rev. Stat. c. 218, s. 19, Amended—Vacancies in Board

3. Section 19 of the said Act is amended by adding thereto the following words: "Provided, however, that if such vacancy occurs in any local board as constituted under subsection 1a of section 14, the Board of Control or the Council, as the case may be, shall appoint another member upon such board, subject to the provisions of the said subsection."

INDUSTRIAL TRAINING

Every year, more than 2,000,000 children and youths are recruited in the United States and Canada to indsutrial and commercial enterprises. School statistics show that 75 per cent. of the children who enter school leave between 14 and 16 years of age to work in mills, factories and stores.

The percentage going to work at this age with definite training is negligible. These young recruits to industry are employed in highly specialized tasks. Drifting from job to job, in later years, many settle down to become handy men and unskilled laborers. Hardly one in a hundred ever obtains a chance to become a skilled worker or master of a trade. What wonder that employers bewail the shortage of skilled workers and that the labor market is overstocked with thousands of unskilled workers.

To meet this situation Canada must provide some form of technical training whereby all who enter agricultural or industrial occupations shall be provided with at least the preliminary elements of vocational training.

NEW LOOSE-LEAF CATALOGUE

The Canadian Wolverine Co., Ltd., Chatham, have been advertising a new catalogue, but as the writer did not have the pleasure of seeing one until a few days ago, no comment could be made about it.

However, it is a splendid catalogue of the loose-leaf kind, every leaf separate and printed on one side only. The whole make up is typical of the goods it describes. Those desiring to procure one of these catalogues need only drop a postal request to the above address to become the possessor of one.

MOVED TO NEW ADDRESS

The friends of Ed. Needham, the worthy Toronto and district representative of the Canadian Wolverine Co., Chatham, Ont., will be interested to know that he has changed his place of abode from 280 St. Clarens Ave., to 165 Clendennan Ave. Ed. never made a move yet that was not one step better, he deserves all he gets, because above all he is on the square, always having in mind the fact that quality and service counts. His firm gives quality and he looks after the service end as far as lies in his power.

ON ACTIVE SERVICE

The following reading matter was unfortunately omitted in the last issue of the SANITARY ENGINEER. It referred to the two accompanying photos which were shown without the wording.

Many are there in the sanitary and heating trade whose sons have responded to the call of the Mother Land. Two of these are the sons of Fred Armstrong, for many years engaged in the plumbing and heating trade and now associated with the Port Hope Sanitary Mfg., Co.



Lt. O. A. ARMSTRONG.
Attached to 58th Batt., 3rd Div., C.E.F.

W. A. O. Armstrong the elder of the two, aged 23 years, was engaged on the staff of the Ontario Workman's Compensation Board before he enlisted and became attached to the 58 Batt., 3rd. Division. He has been in France since October last and no doubt by now will have experienced something of what war is.

His brother Flight Sub. Lt. Fred C. Armstrong is in the Royal Naval air service. He went overseas in November of 1915 and for some time was on duty in the North Sea. He is now attached to the 22nd. wing of R. N. Corps in the vicinity of France. He is 21 years of age, and will no doubt be able to recall some very exciting experiences.

The Sanitary Engineer joins the many friends of Fred Armstrong in wishing both his sons a safe return, feeling none the worse for the right loyal service they are rendering to the civilized world in doing their level best to stamp out all that stands in the way of the world's freedom.

HIGH GRADE GOODS WORN OUT

"Parker, you must use these, self-closing faucets."

"Blair, I can't afford to pay twenty-five per cent. extra on your say-so that they're better."

"I'm willing to prove it.'

"All right! go ahead."

Blair sold hardware, and he was determined to place his specialty—a self-closing basin faucet—in the big Detroit hotel that Parker managed. He knew his goods were the best on the market. He knew they would save the management trouble and expense. But Parker could not see his way clear to leaping the barrier of a high initial cost.

The offer to let him prove the worth of his goods was precisely what Blair wanted.

He took two of his faucets and installed them in the public lavatory of the hotel where they would have the severest kind of use. Next to them he installed two new faucets of the type the management was already using.

"I'll be back in a month," the salesman said to Parker, as they shook hands.

"All right!" laughed Parker. "I dare you to come."

Blair was back at the appointed time. Together with the manager, he went to see how his test was working. His own faucets were as good as new, but the hot water faucet of the two of the usual style was showing a small leak.

"A slight matter," Parker declared. "One of your own faucets might very well do the same."

"I'll be back in two months more." Blair said, in answer; "and you'll sign!"

Blair was back promptly.

"Well, how's the test?" he asked, as he walked into Parker's office.

"Go and see for yourself!"

Blair did so. He found that his own faucets were in practically as good condition as the day he installed them; but the hard use of the public washroom had told severely on goods without special features. They were in bad shape.

"Here's the order blank," said Blair, as he walked back into Parker's office, "all ready except for your signature at the bottom, and the number of faucets you'll need."

"Seven hundred and fifty!" answered Parker, signing.—System.

CLAY TILE Versus CAST IRON SOIL PIPE

(Continued from page 12)

Regina

Question 1.—Answer—No. The use of tile pipe under buildings is not allowed in this city, unless it is for seepage purposes only, and when such drains are collected into a chamber and disconnected from the sewer with an iron trap.

Question 2.—Answer—Yes. medium cast iron is favored for use under dwellings or buildings, because there are fewer joints and these joints being caulked lead, are not subject to leakage with consequent pollution of the subsoil in the event of stoppage. Cast iron has a higher crushing limit, and offers better facility for clean-outs.

Question 3.—Answer — Tile pipe is prohibited under buildings, but it may be used at a distance of not less than three feet outside. This distance will probably be increased to eight feet.

(Signed) H. D. MATHIAS,
Plumbing Inspector,
Regina, Sask.



Flight Sub-Lt. FRED. C. ARMSTRONG.
On active service with 22nd Wing, R.N.C.

It will be plainly seen by the above replies, that every day practice and experience proves beyond doubt which kind of pipe is most suitable, and with a view to still further giving our readers an exchange of ideas from all parts of this continent, both Canada and the United States, this series will still be continued in future issues.

Censor Humor.—A soldier writing home to his people described how he had been buried alive for a couple of hours in a demolished dugout, but was eventually extricated by his comrades. He added by way of consolation—"I had the satisfaction of sending five of the Germans to hell." The Censor in passing the letter had drawn a line through the sentence, but wrote underneath—"It is not permitted to refer to the whereabouts of the enemy."



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHERE CAN I GET A GOOD PLUMBING COURSE?

Editor THE SANITARY ENGINEER.

I am very anxious to become better posted in the plumbing and heating business, and would like to know where I can procure a good training by correspondence. Would you please give me the desired information? C. P. W.

Write Professor Bateman, sanitary and heating engineering department, American School of Correspondence, Chicago.—Editor.

RE TILE AND IRON PIPE

Editor THE SANITARY ENGINEER:

I am very much taken up with the question regarding tile pipe versus iron pipe for drains, but would like to hear what you think about a hard and fast rule regarding this question. For instance, there are quite a number of by-laws in force in Canada that demand cast iron soil pipe for all drains under buildings, and I am of the opinion that there are cases which would not warrant the use of iron at all. In fact it would eat the iron pipe through in a very short time.

I refer to waste pipes in electro-plating plants, chemical works, ice plants, tanneries and the like. What is your opinion about this phase of the question? C.R.P.

No Friend of Cock Pipes

Regarding the above question, we might say that while the discussion all through re "tile versus iron" is in favor of cast iron soil pipe for use under dwellings and buildings, there are always, and always will be certain exceptions. These can be and should be very specific.

No sanitary engineer would demand the use of cast iron soil pipe to carry away waste from a tannery, ice plant, plating plant and the like. But this is where many plumbing and sanitary by-laws are not compiled by practical men, men of experience.

Every sanitary plumbing by-law should be submitted to some one that is not in anyway interested in the doings of that particular town for which the by-law is being compiled, to some disinterested party of wide experience and well read.

The writer has several proposed by-laws before him now that are anything but complete, and in many cases the slightest elimination or addition would make all the difference in the world.

The writer does not favor cast iron pipe where the waste, or substance is of such a nature as would corrode the pipe. In such cases a vitrified salt glazed tile pipe should be used, and embedded well on a layer of cinder ballast, then encased with concrete, the walls of which at the thinnest part should be not less than six inches thick. The concrete should also be reinforced with iron rods. Furthermore, such concrete should be down a depth of several feet below the ground. The reinforcing is required for strength to protect the tile pipe from being fractured.—Editor.

NEW CANADIAN PATENTS

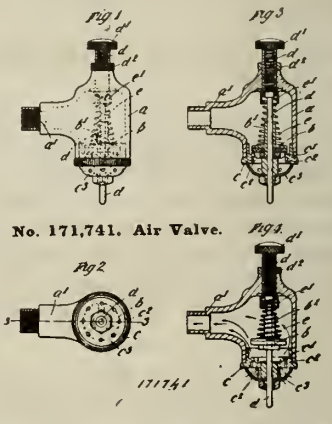
(Continued from page 24)

provided with a manually adjustable pointer adapted to be moved to a position to indicate the desired degree of humidity, and a pointer responsive to changes in humidity, circuit wires connected with each of said pointers and adapted to afford a closed circuit when said pointers are in a position of coincidence, an electro-magnet connected with said circuit wires and adapted to be energized by the closing of said circuit, a pipe within which the electro-magnet is mounted, and a flap valve hinged in proximity to the magnet and adapted to be drawn down into closed position by magnetic action and against the pressure of the humidifying agent when the magnet is de-energized adapted to be lifted against gravity and under the pressure of the humidifying agent when the magnet is de-energized for controlling the discharge of the humidifying agent, substantially as described.

No. 171,741.

Edward McCann, Warwick Street, London, England, 5th September, 1916; 6 years. Filed 16th November, 1915. Receipt No. 258,046.

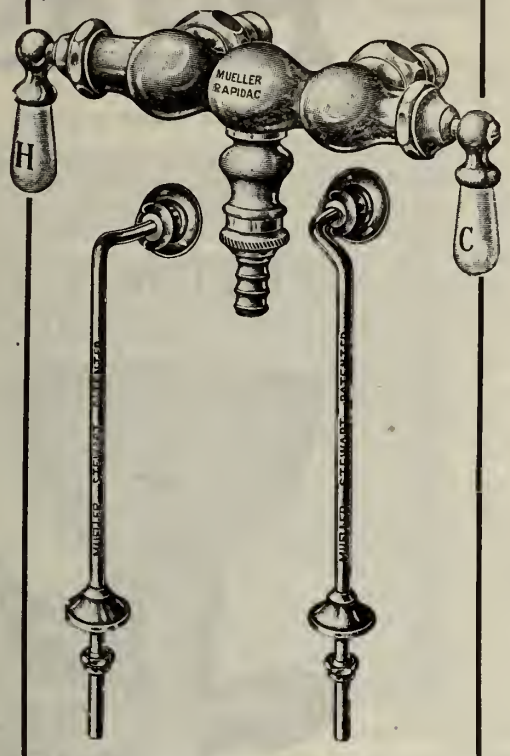
Claim.—1. An auxiliary air valve for internal combustion engines, comprising in combination a casing or valve body,



No. 171,741. Air Valve.

a rod extending into said casing, a valve or plug slidably mounted on said rod, and a spring housed within said casing against which spring the valve is moved by the engine suction.

2. An auxiliary air valve for internal combustion engines, comprising in combinaton a casing or valve body, a rod extending into said casing and adjustably mounted therein, a collar or abutment on said rod, a valve or plug slidabably mounted on said rod, and a compression spring housed within said casing and interposed between said valve and said collar or abutment.



**Fuller in Design—
Compression in Action**



Two Designs in

MUELLER Rapidac

THE MORE YOU KNOW ABOUT BRASS GOODS THE BETTER YOU LIKE

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One of our customers said:

"My father and I have been in the plumbing business over 25 years and our biggest losses have been caused by troubles with inferior brass goods.

"We are building up a splendid business on quality brass goods. Every dollar we spend with Mueller's is like putting money into the bank with compound interest.

"WE NEVER HAVE TO GO BACK TO REPAIR MUELLER RAPIDACS."

The Mueller Line costs a little more than the ordinary ones — but you buy more quality and more satisfaction.

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H. Mueller Mfg. Company, Limited

SARNIA, ONTARIO

Makers of Fully Warranted Water, Plumbing and Gas Brass Goods

3. An auxiliary air valve comprising a casing having an open extension adapted to establish communication between the engine induction pipe and the interior of the casing, an adjustable rod mounted in said casing and having a collar or abutment thereon, a disc or flat valve slidably mounted on said rod, and adapted to close a second opening in said casing and a compression spring housed within said casing and interposed between said valve and said collar or abutment.

4. An auxiliary air valve for internal combustion engines, comprising in combination a casing having a tubular extension adapted to be screwed into the engine induction pipe, a detachable portion having air inlets and fitted in said casing, an adjustable rodmounted in said casing, and provided with a collar or abutment, a disc valve slidably mounted on said rod, a compression spring housed within said casing interposed between said valve and said collar or abutment a seating on said detachable portion against which the disc valve is pressed by said spring, and a protective cover adjacent to the air inlets in said detachable portion.

BAD PLUMBING AND DISEASE

A plumber conducting business in Staten Island, N.Y., made the following contribution to the New York Globe:

"During the last twenty-two years I have installed thousands of traps in connection with plumbing fixtures, all provided with proper ventilation pipes to protect their trap seals and prevent the accumulation of odors and gases in the general piping system without having any complaints. Plumbing done in this way is a protection against disease. The frequent use of the fixtures allows no germs to gain a foothold and permits no accumulation of any character to decompose and send out dangerous emanations. Where there is trouble it is due to the improper connection. Sewer gas allowed to enter rooms is more dangerous than illuminating gas as the latter is easily detected. There are several kinds of diseases that can be contracted from bad plumbing and the most of these lead to inflammation and fever, preparing the subject to succumb to the first malignant attack that may be made upon him. To protect people against the effect of bad plumbing, laws have been provided requiring for the examination as to competency and the licensing of plumbing contractors.

"In Great New York the majority of the plumbers are unlicensed, which is an unprincipled neglect of official duty in protecting the people against bad work and the licensed plumbers from an unlawful competition. The unlicensed crew which does plumbing work includes the handyman, the janitor, and a number of other mechanics. Formerly, practically every plumber was licensed and registered. Now, too large a proportion has not been forced to comply with the law by the Board of Health and that is the reason why so many waste and soil pipes are found with holes in them stopped with corks and wooden plugs. This may or may not have had an effect on the epidemic of infantile paralysis. On several occasions I have been called upon on the order of doctors to remove wash basins from bedrooms where the overflow was connected on the wrong side of the trap, making a by-pass permitting the free entrance of air from the sewer. Every citizen changing his residence should look carefully to it that the plumbing system is properly designed and in good order."

Commenting upon the above it seems lamentable that a city like New York should fall into such disgrace as to become practically unmanageable which, according to the above statement appears to be the case regarding its plumbing.

The writer paid a visit to that big city some time ago and while seeing some splendid systems of plumbing, there were far too many conditions of an insanitary nature. Beautiful hotels with old style traps, which emptied every time they were used, and gurgling could be heard when other fixtures were flushed.

This is another proof that annual inspection of plumbing is absolutely necessary, no matter where the plumbing is installed. We have the same conditions prevailing in almost every Canadian city.

One reason why a federal department of health is necessary too, is to ensure that wherever plumbing is installed, there shall be some by-law governing the installation of the same. Our provinces could then remodel the by-laws to suit climatic conditions, just as it did by our cities.

But by all means let us have annual inspection in all congested towns and cities at least.

PURO
(MADE IN CANADA)

Every minute counts in getting maximum efficiency.

Our Puro Sanitary Drinking Fountains positively save 60% in drinking time, besides 35% of water ordinarily wasted. Can you afford to run your plant and lose and waste this money in old-fashioned drinking methods?

EFFICIENCY IS PATRIOTISM



Ask your efficiency expert to figure this out and you will find that:

500 men drink, say, twice a day. Under old conditions it takes between 3 and 5 minutes per man, twice a day. With PURO cutting the time in half, it would save from 1,500 to 2,500 minutes per day at an average wage of 20c per hour. The saving would be from $5.00 to $8.50 per day.

How long would it take to pay for installing our fountains?

NOW IS THE SEASON TO THINK OF YOUR WATER PROBLEMS.

ASK OUR EXPERT ADVICE.

Puro Sanitary Drinking Fountain Co.
147 University Ave., TORONTO, CAN.

The Cost of Selling

Scarcely necessary, is it? to protest that you must spend some money, much or little, to keep yourself and your merchandise known to your customers and should-be customers.

This you admit, but—DO YOU FOLLOW CLOSE UP THE LEAD OF YOUR CONVICTION?

Are you spending the money?

Let's look at the cost of close-up work in

THE FARMER'S MAGAZINE

A half-page 12 times will cost you $367.20 ($30.60 per insertion). A full page, $714.00 ($59.60 per insertion).

Not a heavy annual cost to canvass the choicest class of farmers in this country—farm homes of greatest prosperity, progressiveness and capacity.

But—are you keeping a salesman always on the job?

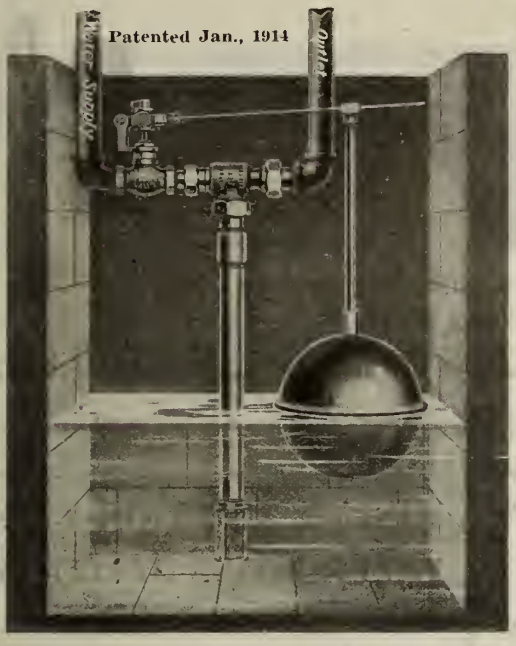
You should—and can, at so low a price.

Write in about it.

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MORRISON
Automatic Cellar Drainer



A simple, durable, automatic device for draining cellars, wheel pits, furnace pits, cesspools, foundations, and for any purpose where it is necessary to remove water economically from one level to another by water pressure.

The operation of the machine is extremely simple, being actuated by the raising or lowering of float as the water level changes in the pit. It operates purely by water. With our patented improvement it works under a far greater range and gives much larger capacities than any other device on the market, so far as we know, operating as low as 10 lbs. water pressure.

The operating limits of other types of cellar drainers range from 15 to 18 feet lift. The Morrison machine lifts as high as 30 feet at 60 lbs. pressure.

All working parts above water. Nothing to get out of order.

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Our Mixed Metal Sales Amount to Over $5,000,000 Annually

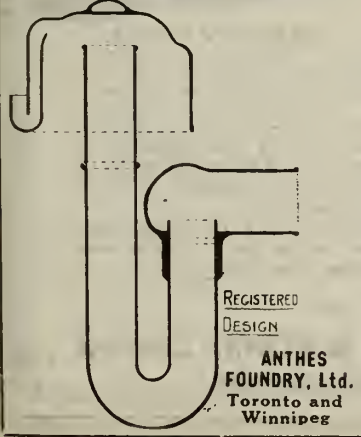


HOYT'S WIPING SOLDER is as perfect as experience and first class ingredients can make it. As only one perfect Wiping Solder can be made we manufacture only one grade, which must necessarily be Hoyt's high standard of quality.

Special attention is called to our Bar Solders, Wire Solders, Lead Pipe, Waste, Traps and Bends. Your orders will have prompt and careful attention, not sometimes—but all the time.

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y.; London, Eng.; St. Louis, Mo.



IF IT'S SYPHONS, ASK US

And look at this one. Note the long caulking length.

Ask us about our inside vented syphon. It's a dandy. Saves making many joints.

We unconditionally guarantee every syphon to operate automatically. And it has no moving parts.

Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

SINCE IT'S ONLY A HANDFUL

WHY LEAVE IT BEHIND?
3 Sizes Capacities ⅛ to 8 inch pipe



WILLIAMS "VULCAN" CHAIN PIPE VISE

Before you return you may need to turn a thread, make a bend, cut off an end or perform any of the other ordinary operations for which a steamfitter is usually summoned.

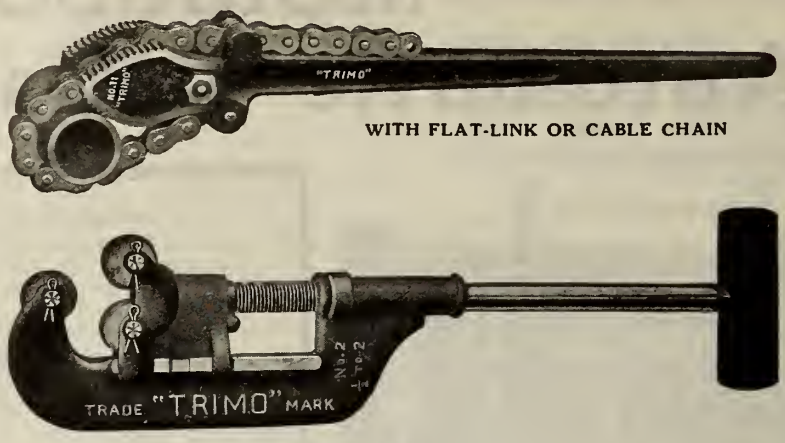
Better go prepared and clinch a life-long customer on your first visit.

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The Wrench People

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TRIMO



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WITH FLAT-LINK OR CABLE CHAIN

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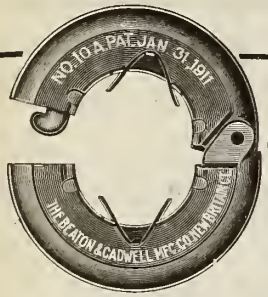


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Cleaning screws, and drain checks, prevent flooding. Machinists, Brass Finishers and Plumbers' specialties.

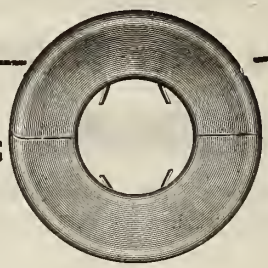
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The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."

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High quality at the right price.



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Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

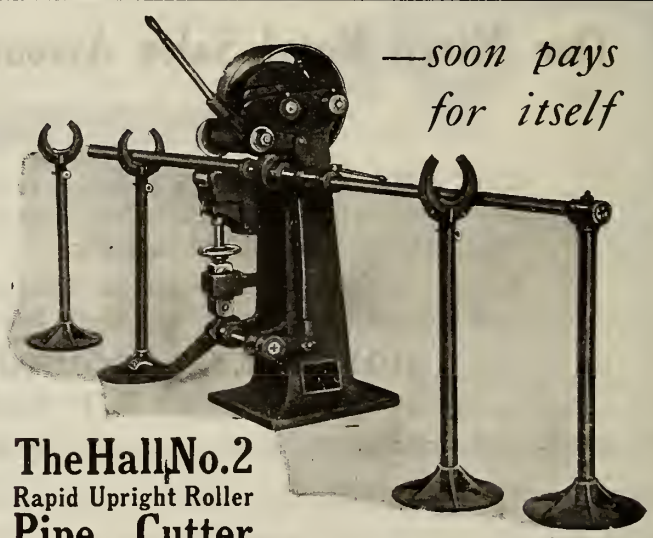
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New Britain, Conn.

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IN A MEDIUM-SIZED SHOP IT WILL SAVE ENOUGH TIME AND PIPE TO EASILY PAY FOR ITSELF IN LESS THAN TWO YEARS, AND AFTER IT IS PAID FOR THE SAVINGS GO TO MAKE LARGER PROFIT.

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Delivery from stock. No delay.

JOHN H. HALL & SONS, Limited
BRANTFORD, CANADA

"THE KING"
OF THEM ALL

Note the thin waterways and wide heatways. Just look at the deep fire-pot. Every pound of coal is given a chance to transmit heat to the radiators.

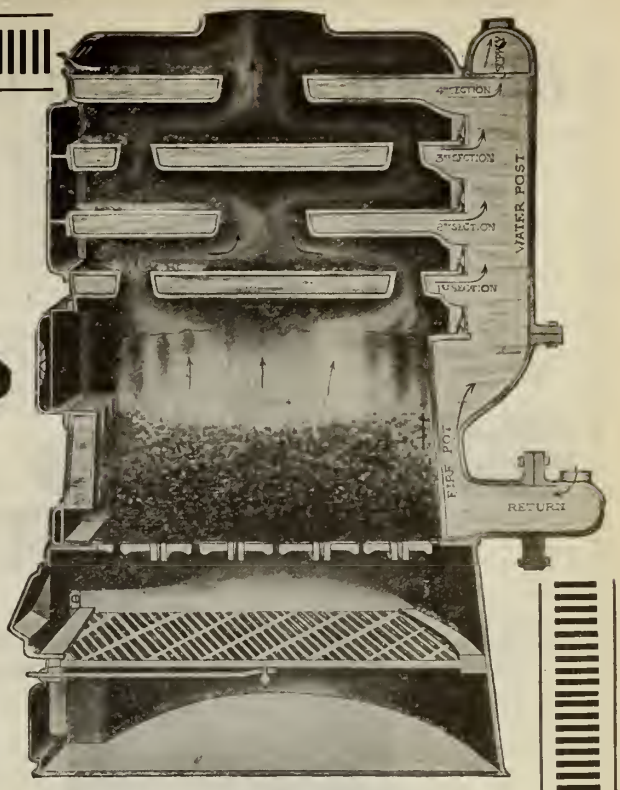
These are the outstanding features which make King Boilers the most effective heating appliance on the market.

STEEL and RADIATION, Limited

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AGENCIES IN ALL LEADING CITIES



Sectional View "King" Boiler, High Base

LOOK AT THE WATERWAYS

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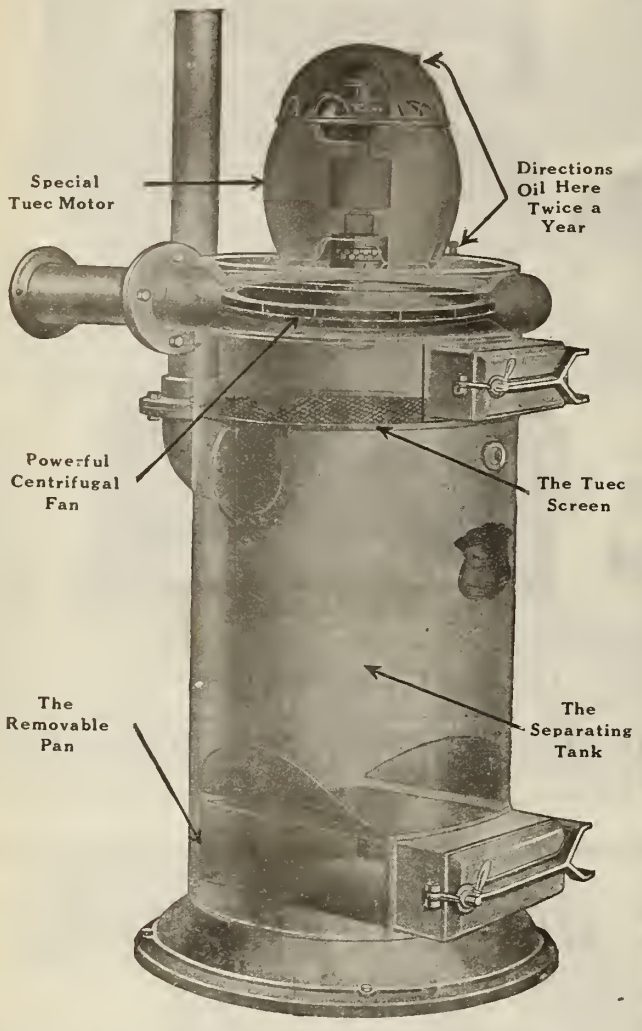
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HEALTH AND WEALTH ASSURED



THAT all dusty homes and buildings are insanitary, goes without saying. Every particle of dust can be removed from every corner of the room by using a TUEC.

UNTIL every Sanitary Engineer fully realizes that dust means death to the inhaler of dust, they cannot rightly claim the title "Sanitary Engineers."

EVERY Tuec stationary cleaner means health for the user, and wealth for the sanitary engineer installing the equipment. It's easy money, sure.

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Write us at once for our proposition

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JUST OFF THE PRESS

A VERITABLE encyclopedia of modern practice based on work done by the author and other experts in every branch of plumbing and allied trades.

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C. A. Dunham Co., Ltd., Toronto.

Air Valves.
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Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
Darling Bros., Ltd., Montreal.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
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James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
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Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
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James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Canadian Wolverine Co., Ltd., Chatham.
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Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Limited, Galt.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Brass Pipe and Tube.
B. O. T. Manufacturing Co., Toronto.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Drainers.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Cluff Mfg. Co., Ltd., Toronto.
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James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.

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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto

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Drainage Fittings.
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Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

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Kerr Engine Co., Walkerville.

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Williams, J. H., & Co., Brooklyn, N.Y.

Unions.
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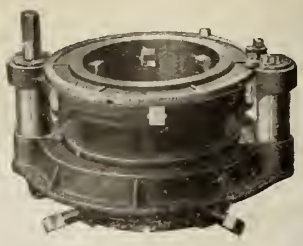
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No Changing of Dies, No Backing Off, No Straining of Pipe, Full Thread at One Cut.



That's the method of the

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Beavers not only thread large pipe easily, but they have advantages not found in other tools—our catalog gives them in detail. ⅛ to 12" R or L.

Beaver Pipe Cutters

Beavers represent the greatest improvement in pipe-cutting tools in a generation. Ordinary wheel and roller cutters squeeze or crush pipe apart. They raise heavy burrs and often split the pipe. Beaver square-end pipe cutters cut pipe with knives clear through. They cut square, without a burr.

Drop a card for full details.

Manufactured by
The Borden-Canadian Co.
Toronto, Canada

"BEAVER"

Gas Water Heater Time Is Here

Are you doing your best towards reaping the benefits to be had through development of the sale of Gas Water Heaters?

20,000 Gas Water Heaters are in use in Toronto, but there is room for 40,000 more. The campaign of education being carried on by The Consumers' Gas Company is going to be a big assistance to the Sanitary Engineer who makes an effort to go after the business.

The Consumers' Gas Co'y.
12-14 Adelaide Street West, - TORONTO
Phone Adelaide 2180

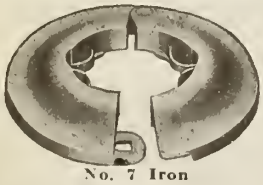
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BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES Black and Galvanized All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED
Montreal Works: Lachine, Can.

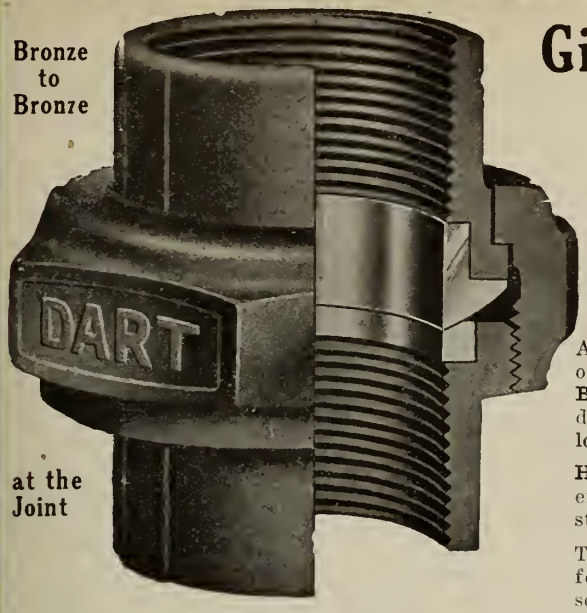


No. 7 Iron
3-8 in. to 3 in.

The "B. & C." Combination Floor and Ceiling Plates
The standard for years, and carried by the leading supply houses.
Insist on "B. & C." Plates.
Manufactured exclusively by
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No. 10 Steel
3-8 in. to 4 in.



Give your pipe coupling troubles a decisive knock-out

by using

DART UNIONS

At the joint, the vital part of the union, **Bronze meets Bronze**—there is nothing to deteriorate and cause loosening up and leaks.

Heavy Malleable Iron Pipe ends and Nuts insure strength and durability.

Then again there is another feature, trifling it may seem, yet it adds wonderfully to its use and value. **The ball-shaped seat.** This ball-shape allows for an easy connection regardless of the alignment of the pipes. And of course it fits perfectly.



Dart Unions are permanently efficient and economical. They leave no loop-holes for complaints.

YOUR JOBBER SELLS THEM

Manufactured by DART UNION CO., Limited, Toronto, Canada

KERR GATE VALVES



I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.

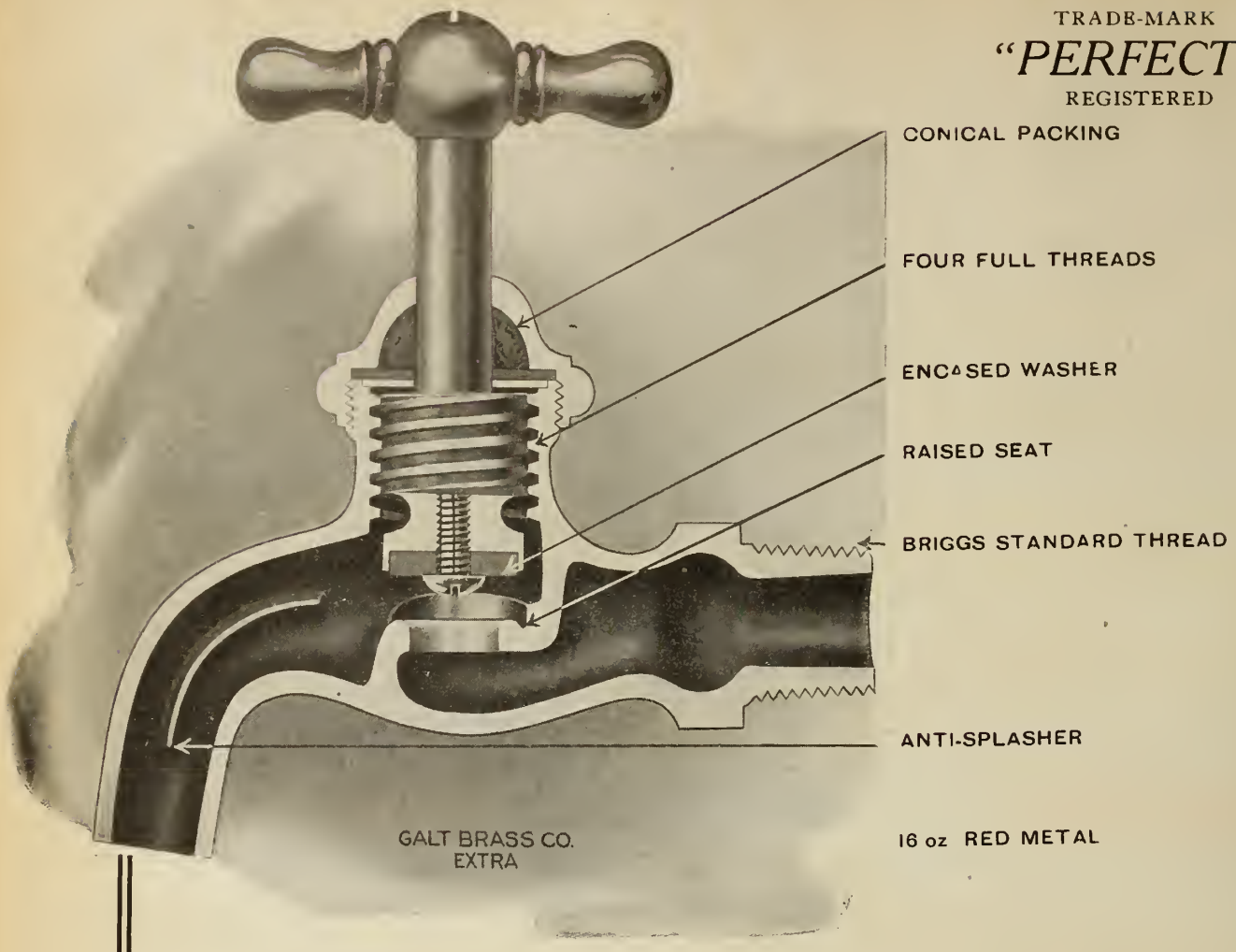


BRASS GATE

THE KERR ENGINE COMPANY, LIMITED

WALKERVILLE, ONTARIO

TRADE-MARK
"PERFECTO"
REGISTERED



The above illustration shows, in actual size, the exact construction of all our Bibbs.

They are all Quickopening, having Double Thread on stem.

The same features are also embodied in all our Bath, Basin and Sink Cocks.

GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

The Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, APRIL 16, 1917 | No. 8

EMPIRE M'F'G. Co. LIMITED.

The Links That Hold



You may or may not know that we carry the largest stock of plumbers' and heating engineers' supplies on hand in Canada. Our Factory is the largest of its kind under the British flag, and we are in a better position to make prompt shipments than any other concern in Canada.

That's Service

Having our own chemist, our own laboratory, and insisting upon making our goods of uniform mixture, based upon actual tests and half a century of practical experience, proves that Empire Brass Goods are excelled by none.

That's Quality

These two links are the secret of our success. Let us share it with you.

While others are claiming quality, we guarantee it.

EMPIRE M'F'G. Co. LIMITED.

LONDON TORONTO

FILE COPY

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for **BEAVER BRAND CAST IRON ENAMEL WARE**

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

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Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Quality Maintained

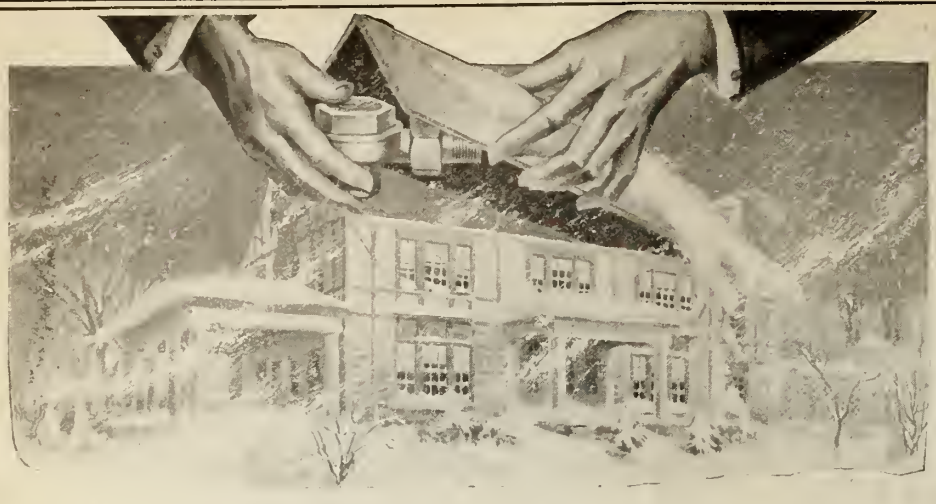
The increasing cost of raw materials that enter into the manufacturing of rubber supplies and the higher cost of labor justify advances in prices. But our policy has been, and will continue to be, to maintain, as long as possible, the stability of prices to dealers, advancing just as little as possible, considering the cost of manufacturing.

In no case will quality or workmanship of Dominion Rubber System products be sacrificed for the sake of price. We insist upon maintaining fully the quality of each and every line we manufacture, regardless of cost. That ensures the same genuine satisfaction that has always made the Dominion Rubber System products so popular with trade and consumer alike throughout Canada.

Canadian Consolidated Rubber Co. Limited

Head Office - - - Montreal

Service Branches: **Halifax, St. John, Moncton, Quebec, Ottawa, Toronto, Hamilton, Brantford, London, Kitchener, North Bay, Fort William, Winnipeg, Brandon, Regina, Saskatoon, Calgary, Edmonton, Vancouver, Victoria.**





DUNHAM RADIATOR TRAP

This device is one of the fundamentals of the DUNHAM VAPOR HEATING SYSTEM. Because it makes impossible the presence of water in radiators, it prevents their pounding and knocking, reduces fuel consumption, causes the radiator to heat evenly and quickly, eliminates the hissing air valve and spurting water.

UNCOVER your Storehouse of possibilities by using heating specialties that build business---

How many times during the past year could you have served your clients better by helping them decide on Healthful, Sanitary and Comfort-producing Heating.

If you let these opportunities slip you lose the chance of making a satisfied, business-building customer.

Do you know that Dunham Heating is ideal for homes? Because of the Dunham Radiator Trap it is Noiseless—no pounding or knocking.

It eliminates the use of air valves on the radiators. They are annoying, troublesome, dirty.

Dunham Heating gives an even temperature, automatically adjusting itself to outside weather conditions. Doing away with weary trips to the cellar.

Easily controlled, quick to heat—when and wherever wanted. As easily cooled off.

The automatic operation of a Dunham System precludes possibility of damage from neglect. Extremely low pressure, few ounces only required.

There are many heating systems in your locality that can be Dunhamized. For Dunham Systems are simple to install. Each will be a testimonial worth while.

Dunham Heating costs slightly more than the ordinary system, but every user knows it is worth more. It is the result of evolution naturally demanded by twentieth century users.

Are you getting full benefit of the service we are able to offer you?

Just to get better acquainted with Dunham Service and Quality let us send you complete Information Bulletin on

The DUNHAM VAPOR HEATING SYSTEM

Send us a postal card to-day.

C. A. DUNHAM COMPANY, LIMITED
TORONTO, CANADA

OTTAWA
214 Booth Building

MONTREAL
Room 20, 11 St. Sacrament Street

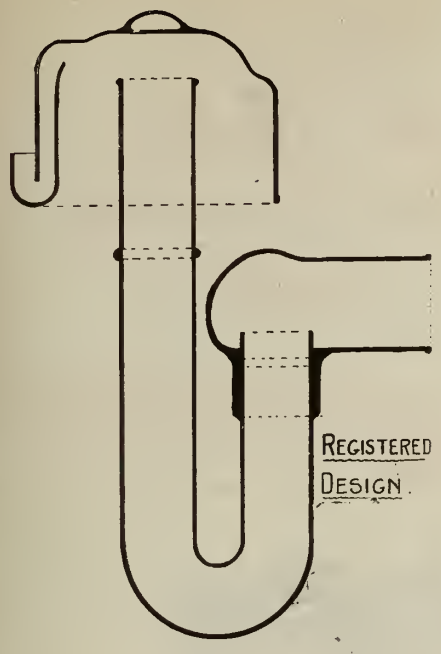
FORT WILLIAM
Plumbing & Engineering Supply Co.

VANCOUVER
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McCurdy Building

CALGARY
Metals, Limited

WINNIPEG
405 Tribune Building



WE SPECIALIZE

IN

Cast Iron Soil Pipe and Fittings

THE ONLY KIND FOR PERMANENCY AND DURABILITY.

YOU TAKE NO CHANCES WHEN YOU ASK YOUR JOBBER FOR THE "ANTHES" BRAND.

WE STAND BEHIND EVERY LENGTH OF PIPE AND FITTING BEARING OUR NAME.

UNIFORM THICKNESS, WEIGHT AND EASY TO CUT.

FREE FROM CRACKS AND SAND HOLES.

See This Syphon, It's Made Right

EVERY SYPHON WE SELL BEARS OUR GUARANTEE, HAS NO MOVING PARTS, WILL NOT CORRODE AND WILL OPERATE AUTOMATICALLY.

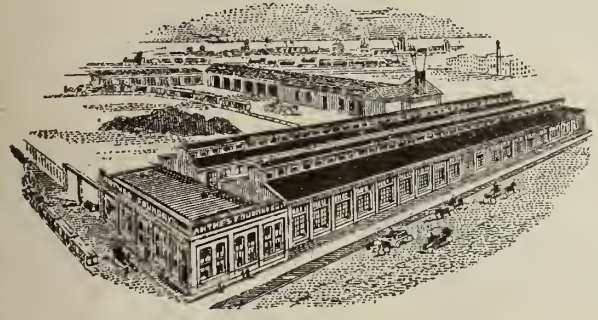
ONCE IT IS PRIMED IT REQUIRES NO FURTHER ATTENTION.



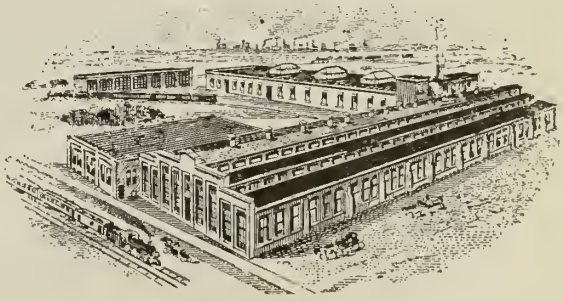
HANDLED BY EVERY JOBBER IN CANADA

Write Us for Our New Bulletin

ON SEWAGE DISPOSAL SYSTEMS



TORONTO PLANT



WINNIPEG PLANT

ANTHES FOUNDRY LIMITED.

"When writing advertisers please mention that you saw their advertisement in the SANITARY ENGINEER."

"Jardine" and "Toledo" Pipe-Threading Tools



No. 11 R

"JARDINE"
Adjustable Ratchet-Threading Tool

Capacity, 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

REGISTERED J TRADE MARK

Best Design

Best Material

Best Workmanship

RESULT

THE BEST TOOL

Perfect Guarantee

Backed up by forty-seven years' experience

OUR AIM

is not to make PIPE THREADING TOOLS just as good,—but is to make PIPE THREADING TOOLS just a little better than any others—and we are mighty good shots.

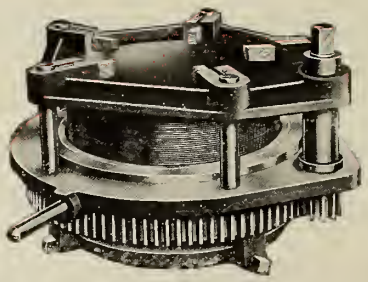
The Proof of the Pudding is in the eating.
TRY ONE AND SEE.

One Man Does the Work of Two

ALL THREADS FROM ⅛" to 12" ARE FINISHED AT ONE CUT.

IT PAYS TO USE THE BEST TOOLS.

WRITE FOR CATALOG



"Toledo"
Geared Adjustable Threading Tool No. 3

Capacity 4½" to 8" inclusive, complete with Ratchet and Driving Cross.

This tool does the work that formerly required a heavy power machine.

One man can easily thread an 8" pipe.

A. B. Jardine & Company Hespeler, Ontario

Sole makers of "Jardine" Pipe-Threading Tools. Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.

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THE BURNHAM BOILER ONCE SOLD—STAYS SOLD

IT'S how much a boiler costs in the **end** that counts. Not how much it costs in the beginning.

If you have to keep all the time making a lot of repairs that you really can't charge for, in order to keep a customer sold on the boiler you sell him—that boiler actually costs you more in the end than the boiler that costs a little more in the beginning—but **keeps itself sold.**

Besides, it's bad business to have to make excuses for the boiler you sell. People will just naturally tell their friends about the excuses you make. And those friends just naturally won't be keen about buying a boiler that has to be excused for things it does. What they want is comfort **from** a boiler, not excuses **about** it.

Sell a boiler that you **don't have to make excuses for.**

Just such a boiler is the Burnham Boiler. Send for catalog.



Full-on view of Square Sectional Burnham Boiler

Lord & Burnham Co. Limited of Canada

(Boiler Department)

Royal Bank Building, TORONTO

Burnham Cosy Comfort Heat dB

Factory: ST. CATHARINES, ONT.

Tubing is Almost Worth its Weight in Gold

You can SAVE and use to advantage short lengths —just odds and ends of Tubing.



A set which will pay quickly for itself. Catalog "C" page 143 gives the contents of each set.

A complete and practical set no plumber can afford to be without.

CANADIAN WOLVERINE COMPANY, LIMITED

CHATHAM, ONTARIO





OSBORNE HOUSE, ISLE OF WIGHT
FORMER RESIDENCE OF THE LATE QUEEN VICTORIA OF ENGLAND





ROYAL PALACE OF LA MAGDALENA
SUMMER RESIDENCE OF THE KING AND QUEEN OF SPAIN



SANDRINGHAM HOUSE
COUNTRY RESIDENCE OF THE KING AND QUEEN OF ENGLAND

Royal Palaces in which "Standard Sanitary" Plumbing Fixtures were installed—a few notable examples of their world-wide popularity

"Standard Sanitary" Plumbing Fixtures can be obtained anywhere in the Dominion. They are handled by leading Plumbers throughout the provinces and are carried in stock by Jobbers and Sales Agents throughout the Dominion of Canada, thus facilitating prompt deliveries.

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Limited

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SCOTTISH RESIDENCE OF THE KING AND QUEEN OF ENGLAND



THE QUIRINAL
OFFICIAL RESIDENCE OF THE KING AND QUEEN OF ITALY, ROME



BUCKINGHAM PALACE
OFFICIAL RESIDENCE OF THE KING AND QUEEN OF ENGLAND, LONDON



PALACE OF THE KING OF THE BELGIANS
BRUSSELS



A REVOLUTION IN FAUCETS

There was a day when people were satisfied with ordinary faucet service, but the world is opening its eyes since the Quaturn Faucet has been placed on the market.

Operation: As the registered trade mark signifies, the QUATURN opens on one-eighth turn, full flow of water on a quarter turn, but, unlike every other compression type faucet, the QUATURN CLOSES WITH THE PRESSURE, giving absolute security against opening under pressure; especially is this feature desirable on the Quaturn Ball Cock, as so many give evidence of defective shut-off when tanks are full by running continuously into the overflow.

Metal: Castings are of Best Red Brass, except the sleeve, which is Phosphor Bronze, only one grade—the best.

Working Parts: Few in number, accurately machined, and interchangeable. Identical in all our valves of this construction.

Seat Removable: The seat is part of the sleeve, which is cast of Phosphor Bronze, greatly increasing life of seat. The sleeve-seat is removable.

Location of Handle: The handle can be placed in any position by simply loosening the cap. As regularly assembled, the handles close to the side and open to the front.

Appearance: The smooth, beautiful designs and excellent workmanship instantly appeal to people who desire something distinctive in design and service.

QUATURN
TRADE MARK

Show Quaturn—Talk Quality—and you'll make more faucet sales and eliminate bother and expense due to trivial fuller repairs.

The Wallaceburg Brass and Iron Manufacturing Co. LTD
WALLACEBURG ONTARIO

MORE HOT WATER



LESS GAS

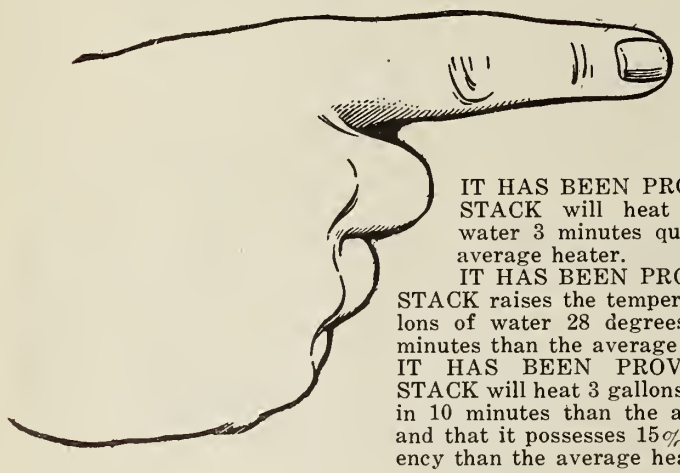
Stack Heaters

Possess Features That Make Them

Sell Fast

Dealers have an avalanche of convincing talking points in selling Stack Heaters. The Stack is quickest of all heaters in action—heats a given quantity of water in less time than any other heater—begins to circulate hot water 20 seconds after it is lighted—begins to deliver hot water at faucet one minute after gas is lighted.

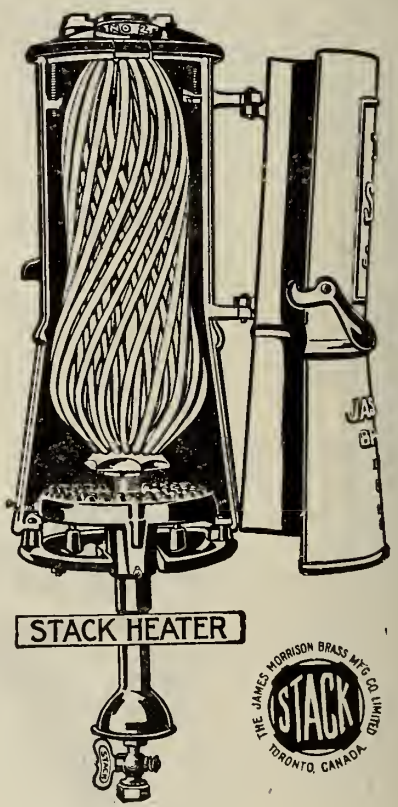
This quick action alone should sell the heater easily, but it can also be sold on the strength of its durability and ease of installation and numerous other features.



IT HAS BEEN PROVED that the STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

IT HAS BEEN PROVED that the STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

IT HAS BEEN PROVED that the STACK will heat 3 gallons more of water in 10 minutes than the average heater, and that it possesses 15% greater efficiency than the average heater.



Plumbers' and Steam-Fitters' Supplies

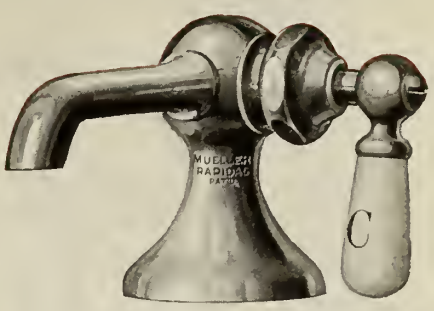
When you see the name JAMES MORRISON Brass Manufacturing Co., Ltd., on Plumbers' and Steam Fitters' Supplies you can depend upon them being quality articles. There is nothing in steam fitting and plumbing supplies that you can't get at "Morrison's."

Inquire of us about the STACK and any information you would like about our complete line of supplies.

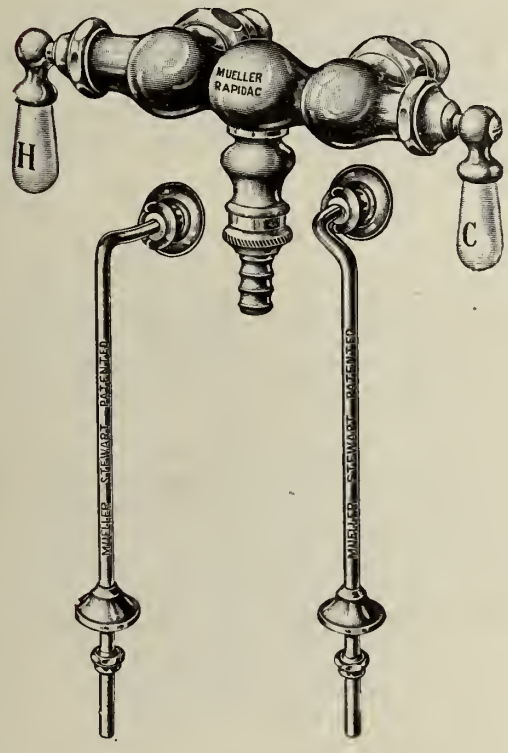
James Morrison Brass Mfg. Co.. Limited

93-97 Adelaide Street West, Toronto

"Mueller" products are made of high copper-bearing bronze—nothing but virgin metal used.
60 years of experience, combined with supreme efforts to produce only the best in brass goods, and our warranty of quality and service stand behind "Mueller" lines.



MUELLER
Rapidac



Buying your Brass Goods from the Mueller Mfg. Co. insures the use of a line in which you can place implicit faith.

Baths, Lavatories, Sinks and Laundry Tubs when affixed with "Mueller" brass goods, bear an appearance that gives tone and efficiency to the work. They reflect the most advanced ideas in Brass supplies.

Many of the largest concerns in Canada find that our products meet their most exacting demands, and therefore use them exclusively. Mueller goods are business-builders.

Fully Warranted

H. Mueller Mfg. Company, Limited

SARNIA, ONTARIO

Makers of High-Grade Water, Plumbing and Gas Brass Goods and Jobbers of General Plumbing Supplies



¶ In the Whole British Empire

There is but one firm producing PNEUMATIC WATER SUPPLY SYSTEMS, building their own tanks, pumps, electrical equipment, etc., in short, SYSTEMS.

¶ In the Whole World

There are but three firms in this class—one of them right here in Canada—all the others, and they are legion, are assemblers, buying a tank here to-day, somewhere else to-morrow, pumps, switches, circuit breakers, and the many other items necessary from a thousand sources.

How can such a combination become a SYSTEM in the sense that the various parts will operate in harmony—that will go together and "WORK AS YOU HOPED THEY WOULD?"

If you have had troubles with imported goods, you will know the difficulties experienced in overcoming them—the loss of time—the expense—prolonged correspondence—the dissatisfied customers—all through no fault of yours, EXCEPT that you did not BUY IN CANADA.

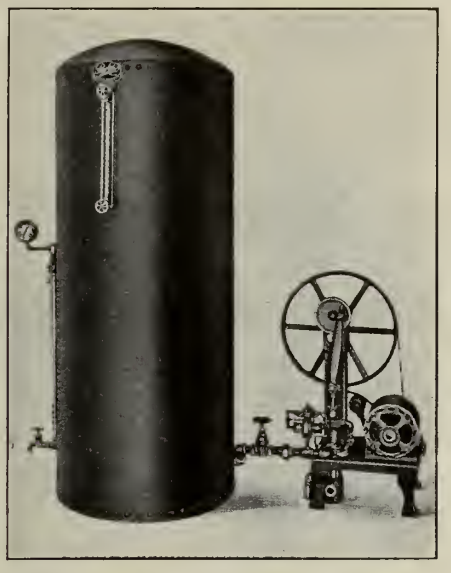
¶ Canadians !

THE WHOLE WORLD IS WATCHING US.
ARE YOU HELPING?

National Equipment Co., Limited

TORONTO, CANADA

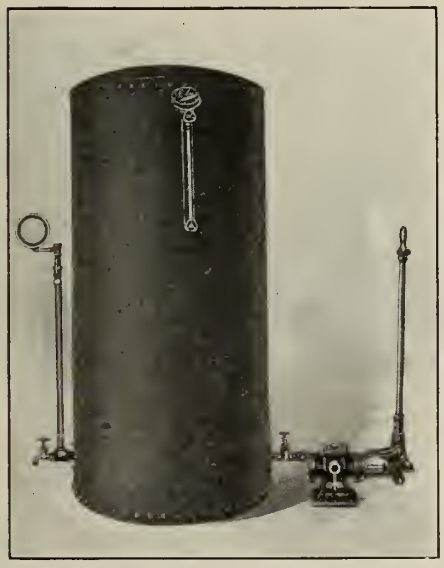




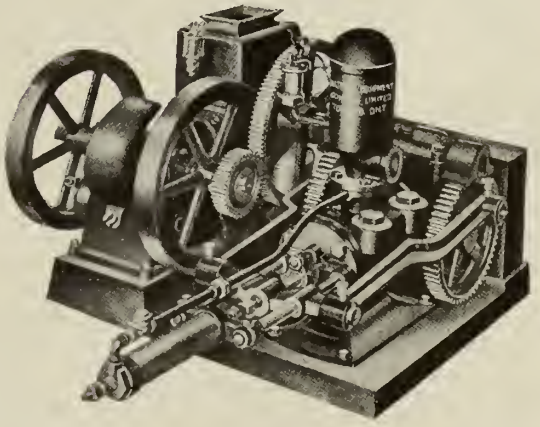
500 Series—Automatic Electric 250 gallons per hour.



300 Series—Automatic Electric 125 gallons per hour.



112 Series—Hand Power. Easiest operated pump in the world.

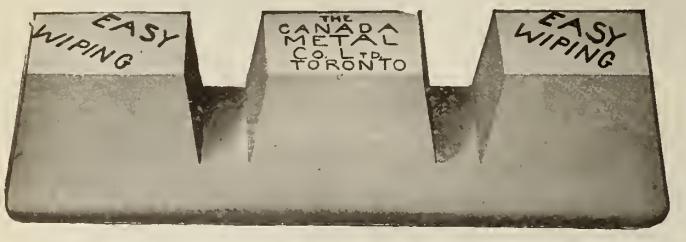


Direct connected Gasoline Engine Pumper, Automatic Control.

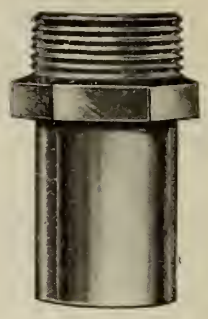
National Equipment Co., Limited

TORONTO, CANADA

EASY WIPING SOLDER

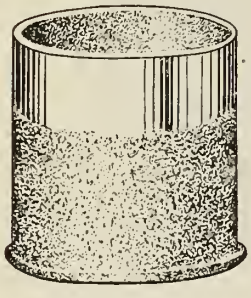


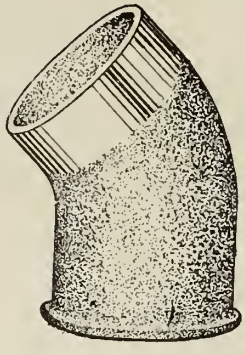
THE PLUMBER'S FAVOURITE
SECOND ONLY TO OUR EXTRA STAR
7 lbs. each.



Baths, Lavatories, Sinks and All Plumbing Supplies Everything in Metals

BRASS FERRULES





We make

IMPERIAL

SOLDERING NIPPLES

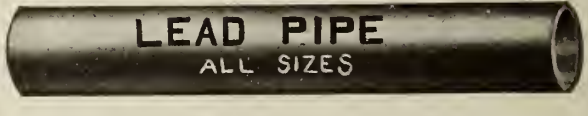
Without Doubt the Best Soldering Nipples You Ever Saw.

They Have Quality, Weight and Finish.

Our brass ferrules are high grade, free from sand holes, easy to tin, and sound in every detail.



We pride ourselves on being able to furnish the finest sheet lead in Canada in any length, width (up to 7 feet) and thickness.



Patent Soil or Waste Pipe in lengths of 8 feet.

You cannot buy better lead waste pipe traps and bends in Canada than what we make. **And we make them.**

Even thickness and purity of metal is one of the outstanding features.

We sell everything in metals.

Write for Catalogue "A"—Mailed Free

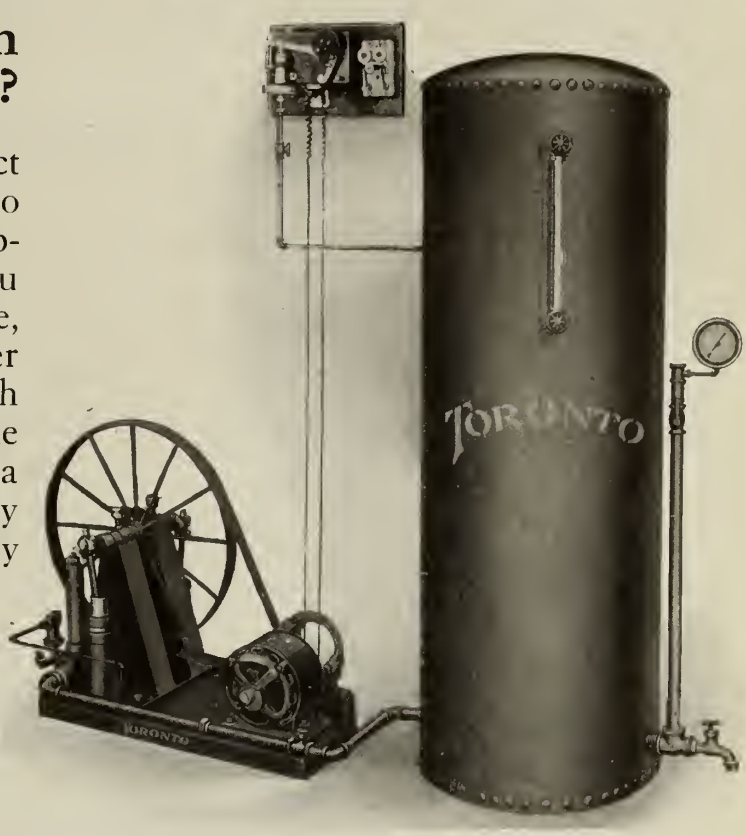
THE CANADA METAL CO., LIMITED

TORONTO, CANADA

200,000 FARMS

Does This Mean Anything to You?

Do you appreciate the fact that 200,000 Farms in Ontario are as yet without Water Supply Systems of any kind? You cannot sell to all these people, but there are a certain number of farmers within your reach who can be educated to the advantages and necessity of a Water Supply System as easily as they were persuaded to buy automobiles.



Get After This Country Business

A little canvassing, a little advertising, a little push and a satisfactory outfit properly combined will let you in on the ground floor. Don't take our word for it, get out into the country yourself, and you will find that every housewife wants a Water System of some kind or other, and sooner or later she will buy one from some person—it might as well be you.

ONTARIO WIND ENGINE & PUMP CO. LIMITED
TORONTO

HAND OR POWER WATER SYSTEMS

Be careful what kind of a water system you sell. TORONTO Water Systems have already proven their word—they have stood the test. Twenty-five years' experience is built into them, and our whole reputation stands behind them.

Write for our Prices and Circulars to-day

ONTARIO WIND ENGINE & PUMP CO.
LIMITED

Montreal **TORONTO** **Regina**

THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, APRIL 16, 1917 No. 8

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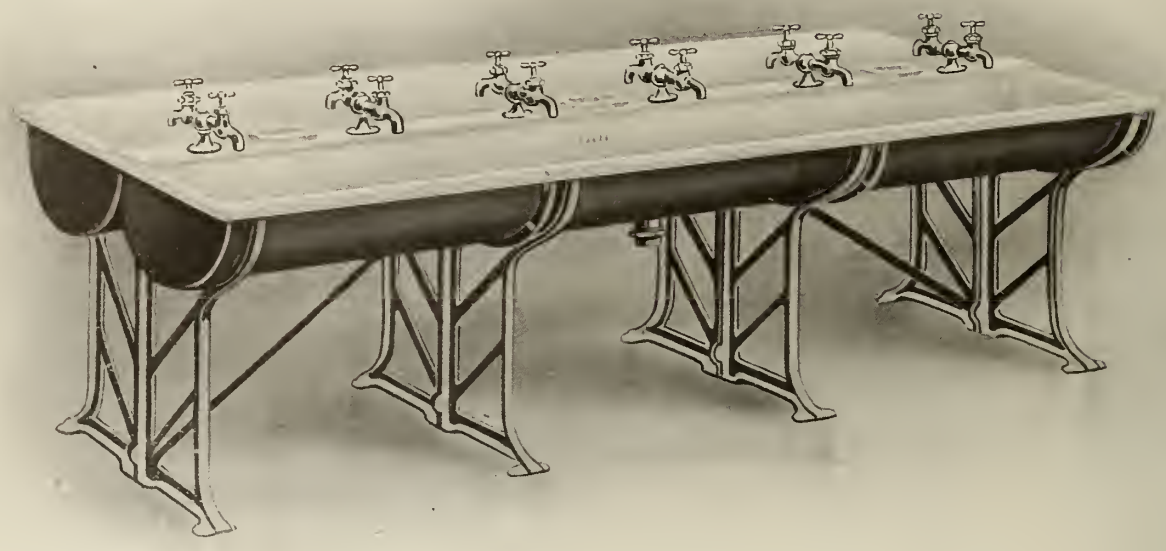
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THE SANITARY ENGINEER

VOL. XI APRIL 16, 1917 No. 8

Twentieth Century Heating

One of the Most Important Problems in Building Equipment These Days is That of Heating—Thousands of Dollars Wasted Every Year in Fuel and in Health by Improperly Heated Buildings—Some Splendid Talking Points for Heating Engineers.

By C. A. Dunham.

THE fire place and the stove represent an epoch in history in which tin bath tubs were a luxury in the home. The period that followed, brought with it a demand for something better, and this demand was met by hot air furnaces, hot water heating systems, the steam heating systems, and likewise the more sanitary porcelain tubs.

The problem of heating in those early days was one calling for better heat distribution, while in the case of a plumbing fixture it was simply a sanitary measure that brought about the change.

Up until the last ten years, more thought and intelligence were given to the plumbing within the home than were given to the heating; beautiful porcelain tubs and lavatories with running water, and marble or encaustic tile floors and walls in the bath room, appealed more strongly to the home lover. The reason for this was lack of a grasp on the subject of heating. It was looked upon as too intricate and serious a problem to be considered by any one except the man who had served an apprenticeship in the shop around the corner.

But to-day, the man or woman who builds has come to realize, as never before, that proper heating contributes more genuine comfort and satisfaction, as well as health, than anything else about the home represented by a like investment.

The public has learned that there is no great mystery about a heating system; that, after all, heat is produced from the combustion of fuel, and that it may be distributed equally through the living rooms by well known and infallible laws governing it.

The awakening hour reveals something tangible which shows that home heating is now entering the third lap of its evolution. Increasing cost of fuel and a growing knowledge that the weaknesses of the old methods are unnecessary, brings with it a desire for the best that inventive genius can provide.

As a matter of fact, it is becoming more and more prevalent among builders to give serious thought to the heating of a prospective building and to appropriate funds in advance sufficient to insure this incalculable blessing to those who draw therefrom.

The time is past when any person will build a beautiful place in which to live and be indifferent to this vital equipment; it is the very heart of the home, and its importance cannot be measured by anything else which the builder places within the four walls.

The time is past when the builder can use what money he may have left after putting up a building, and fit the heating system to this amount, or install within the home a heating apparatus whose chief distinction lies in the small cost of installation. Now, the best is demanded because of this awakening, and because the semi-modern methods of heating do not fulfill the requirements of an ideally heated home or apartment.

Greater importance is given this factor within the home and the apartment, than ever before. Builders recognize that while good things cost more there is no better dividend producer, measured in comfort, health and real economy of high priced fuel, than is afforded in quality heating.

Has the reader ever stopped to think why potted plants do not thrive, and often die, in the home heated by means of a hot air furnace? This is true, as any one can vouch for who has had any experience with furnace heated rooms. The reason for this is very simple, for since oxygen is necessary to the human life, likewise is oxygen necessary to the plant life, and if the plant does not thrive it must be due to causes which would effect equally the person living in the same atmosphere.

Fresh air and the constant circulation of air is a claim often made in favor of hot air heating, but it is only necessary to analyze the subject thoroughly in order to arrive at the facts which are not in keeping with the claims made, and these facts may be briefly stated, thus: Atmospheric air may, and usually does, contain many thousand particles of foreign matter, in suspension, to the cubic inch and still is considered pure air; but, if put in circulation, as is the case with air passing through a furnace, it takes on many times over the original number of foreign particles of matter, and often becomes so heavily charged as to become unhealthy, to a marked degree. This process, however, does not destroy the oxygen, and while harmful to human life, it might be perfectly safe for plant life.

But the trouble arises from the air being heavily charged with foreign matter coming in contact with the heated sheets of the furnace. This action is necessary with any furnace, that the air may become heated and be carried to the rooms above to impart its warmth thereto.

The moment that this foreign matter, mixed with air, comes in contact with the highly heated sheets, combustion takes place, and the oxygen contained in the air is more or less used up in forming carbon dioxide gas, which is not only poisonous to plant life, but ofttimes proves extremely harmful to human life as well.

Hot water heating presents different problems than the furnace. Water is really a non-conductor of heat and resists it, and like other heat resisting elements, when once stored up, it is slow to give up the heat. This condition is sometimes considered a point in favor of the use of hot water as a heating agency. But this is a mistaken idea since it cannot give off any more heat units than were originally put into the water.

A loss in fuel takes place in the effort to put heat into any heat resisting substance such as water within a hot water boiler; the losses which occur being primarily due to the length of time required to heat the large body of water necessary for circulation through the pipes and radiators.

Steam heating systems, on the other hand, require but little water and are, therefore, rapid in the delivery of heat. The radiators and piping are filled with steam given off by vaporizing the water at high temperatures; one cubic inch of

water making a volume of steam equalling one cubic foot.

Both the hot water and steam systems have devotees. Some argue that since steam is the hotter the radiator may be smaller with steam than when hot water is used, and this is truly a point in favor of steam.

Any builder knows that every square foot of floor space has a cost value, and if filled with large, clumsy radiators, the owner pays a very high interest rate for the privilege.

Some believe that hot water heat is not such a dry heat as steam. This probably is due to the thought that because water circulates inside the radiators it has some influence on the humidity of the room heated. Of course, this is a mistake, since the relative humidity is not altered by either hot water or steam, provided the number of heat units given off are the same in each case.

Steam is easier to control or regulate; it is more responsive than hot water; it has advantages, too, in the freedom from the freezing evil. Contrary to a general belief or opinion, there is less danger of explosion with a steam system than with a hot water system, for greater pressure exists on all hot water systems than usually exists on steam heating systems.

However, over-heated and under-heated homes are a general complaint from the users of either steam or hot water heating. Wasted energy is apparent in each system; pounding, noisy radiators and sizzling, spluttering air valves characterize one, while the sluggish and coal wasting propensities of the other, class each method with the systems of fifty years ago.

These defects have been looked upon as a necessary evil in heating for nearly half a century, but more recently, twentieth century discoveries have drawn away the curtain, so to speak, and we behold a method of heating which is so flexible that it lends itself to the home and apartment, for application and use as never before.

The vapor system of heating is the essence or extraction of all the good qualities of older methods combined; without embodying any of those things which have been found to be objectionable heretofore.

The word, "Vapor" as applied to this system, means steam at extremely low pressures, which is an ideal medium for heating purposes. It is produced easily and quickly and circulates readily, thus transmitting heat to the farthermost room noiselessly and without the inconvenience of the long wait necessary when dependent upon the old methods.

For the enlightenment of those who are still entertaining the belief that the furnace, the hot water system, or the steam heating system must be adopted

(Continued in next issue.)

Compensation Act Amended

Government Approves Amendments to Workmen's Compensation Act With Minor Changes—First Aid Provided for Thirty Days After Accident

A BILL to amend the Ontario Workmen's Compensation Act was passed by the Ontario Legislature in the closing hours of the last session. Introduced for its first reading on March 14, by the Hon. I. B. Lucas, Attorney-General, the Bill passed successfully through committee and subsequent readings with comparatively little change.

One of the most important provisions of the amending Act is that providing for first aid in case of accident, to cover a period of thirty days from the date of the accident. No limit to the amount of medical, surgical, or hospital attendance during this time is to be set, and while no specific amount of aid is suggested to cover the care of the injured working man during this time, provision is made that he is to receive the "fullest care," and charges for this latter service are to be paid out of the accident fund. A change effected in this section of the Bill providing that, not only every workman entitled to compensation under Section 9 of the Amending Bill, but also any workman who would have been entitled to such compensation had his disability lasted seven days, is to be included. In connection with the fees or charges for such medical aid, provision is made that in all cases the fees are not to exceed such as would be properly charged to the workman if he himself were paying the bill. This amount will be fixed by the Board except in case of an employer individually liable and himself furnishing the medical aid. For the protection of the working man, a penalty is provided for any infringement of the clause stating that the working man shall not be required to contribute for medical attendance either directly or indirectly.

Cases Decided on Merit

It has been provided in case of industries which have made provision covering matters of first aid, at least as inclusive as those proposed, that the Compensation Board shall consider the opinions and wishes of both employer and employee. It is also provided, under a new clause, that these cases shall be decided on their merits rather than on any set precedent, owing to the apparent injustice of precedent as laid down in the English courts.

An amendment to Section 60 provides that every copy of an entry in any book or record of the Board, or any document certified by the secretary, shall be received in any court as prima facie evidence of the matter so certified, and a fee of $1 is allowed for the clerk of the court in connection with the filing of an order of the Board.

Employer is Liable

Section 99 is amended to provide that any employer failing to report or furnish particulars of any accident or claim shall, in addition to any other penalty or liability, be called upon to pay to the Board, if so ordered, the amount of compensation awarded in connection with the claim. The following section, dealing with compensation for industrial diseases, is amended to provide that no compensation shall be payable, except where the Board is satisfied that the disease is not due to any other cause than the workman's employment within Ontario, unless he has been a resident of Ontario for the three years next preceding his first disablement.

Change Rate of Compensation

Some additional changes were also made in connection with the operation of the rate of compensation. The former clause, providing that in the case of the death of a working man, the widow was to receive a monthly allowance and $5 for every child till they become sixteen years of age, has been amended to cover contingencies that might arise. The new clause provides that should the widow die, the amount of allowance to children would be doubled, and in the case of an adopted child, it has been decided that this child should receive identically the same treatment as the children of the deceased. In the case of a child being an invalid or unable to care for itself through any reason, it is provided that the child will be cared for after the age of sixteen years of age for a period equal to the length of time the child would have been supported by the working man had he lived.

Executive Officers Covered

In the case of incorporated companies, employers formerly were covered under the Act if circumstances warranted it, but no mention was made of executive officers of such companies. An amendment provides that on special request of the company these officers will be placed on the same footing as employers.

In the case of working men employed in Ontario and resident in that province, who occasionally go to work in the Province of Quebec, provision is made that they shall not, as formerly, forfeit their protection under the Act. In the medical department, the most important amendment in connection with the list of diseases for which compensation is forthcoming, is the addition in Schedule 3, of the disease known as "miners' phthisis."

In this day of sharp, close competition it is only those who fling the weight of their whole lives into their vocation who can succeed in any marked, individual way. A half-hearted or indifferent purpose produces only half-hearted results.

Shop Talks About Leaded Joints

Showing How Lead Joints Should be Made—How Lead Caulked Joints Can be Made Where Water is Running, Even Made Under Water — Material That Should be in Every Shop—No Need for Tarred Oakum.

Article I.

THE question being discussed regarding cast iron pipe in preference to clay tile pipe, brought out one item in defence of tile pipe, and that was the possibility of making of joints in damp places. One poor, deluded drain digger, in conversation with the writer, said that there were more places where house drains had to be laid that were damp and could not be caulked with lead, simply because of the fact that leaded joints had to be poured hot, that such an operation was dangerous, etc., etc.

Now, who but an ordinary laborer would ever put up such a defence? Further, it has been stated very often that very few men really know how to pour a lead joint, and that only a small portion of the lead is really caulked, because of the fact that ordinarily the body of molten lead is about 1¼ to 1½ inches deep in the hub when poured. The caulking of such a depth of metal to any very great distance down would be liable to crack the hubs.

Another argument regarding this method of making lead joints with molten lead was referred to—that of pouring the metal too hot during winter time, when the cast iron pipe is so cold.

It will be plainly seen that some talk upon this matter would no doubt prove very interesting, as well as educative.

In the first place, we will discuss the method of making leaded joints in damp places, or even under water, or where water is running through the pipes to be jointed.

There no doubt will be many readers of the SANITARY ENGINEER that have heard very little about lead wool, or, as it is sometimes termed, "lead fibre." The following data, taken from a paper by Mr. L. M. Jones, before Canadian Society of Civil Engineers, regarding tests made some time ago in connection with the construction of the Port Arthur waterworks system, will be of interest:—

"Before pipe-laying was commenced a series of tests of lead-caulked joints was carried out, and for this purpose some lengths of 12-inch pipe were used with a valve at each end of the line. The pipes were on blocking and standing free, and in all there were four joints. A small hand pump was rigged up, having a displacement of three cubic inches per stroke.

"The foregoing tests were made within a few hours of making the joints, and in order to ascertain what advantage there would be in leaving the joints for several weeks, a test was conducted four weeks later on pipes caulked when the above tests were made. In this test three joints were caulked with lead wool and the fourth with lead wire ⅜ of an inch in diameter. When the test was applied the pressure was gradually raised to 500 pounds per square inch with no perceptible sweating. When raised a few pounds higher one of the joints suddenly moved 1½ inches. The arrangement of pipe was similar to the previous tests.

"One test was also applied on the 24-inch pipe as above, there being four joints in all, caulked with run lead, lead wool and lead wire. When the pressure reached 120 lbs., the run lead joints gave out. On account of the cold weather no further tests were made.

"It should be noted that the pressure exerted on the 12-inch gate at 500 lbs. per square inch, was 56,550



Lead wool is spun in rope form and can be turned into suitable smaller coils to fit hubs, and can be packed and caulked into position in the same way as oakum.



While it is in rope form it can be teased out and used in many ways. It is made of the purest soft lead and can be caulked almost as solid as molten lead. It is more flexible.

lbs., and on the 24-inch, 54,286 lbs. and 120 lbs. pressure.

"Some points brought out in the tests were:—

"1. That lead wool makes a better joint than run lead and lead wire better than lead wool.

"2. That a depth of lead from 1¾ inches to 2 inches from the face of the bell is cheaper and just as efficient as a greater depth. Caulking had no effect on the lead beyond this depth.

"3. The clean spigot allows of a better joint being made than one having a covering of solution.

"4. That the run lead joints gave better results when pressure was applied about four weeks after making than immediately after being made.

"5. That none of the lead blew from the joints until considerable movement had taken place in the joint.

"6. That better results would have been obtained had the pipe been laid in the trench and properly covered, for the reason that no movement would have taken place in the pipes if bends were anchored.

"7. It is evident that all bends of considerable angle should be anchored to prevent movement. This was very clear with regard to the 24-inch pipe."

It will be plainly seen that while the tests referred to were for waterworks purposes, there could be no objections to the results procured; in fact, the evidence is in favor of the lead wool.

But as regards its used by sanitary engineers, it can be seen that on account of there being no need to melt the lead, and therefore to pour it to make a joint that can be relied upon, its use in wet and damp places would prove lead wool to be very handy. There is also the danger of flying molten metal done away with. Time is also saved in melting. No fuel, oil, gasoline, or fire pot, with all their inconveniences when not working very well, is necessary.

There may be some objections as to cost of lead wool as against pig lead, but

TEST No. 1.

Tests Performed on 3 16 in. x 12 in. Steel Bell and Spigot Pipe.

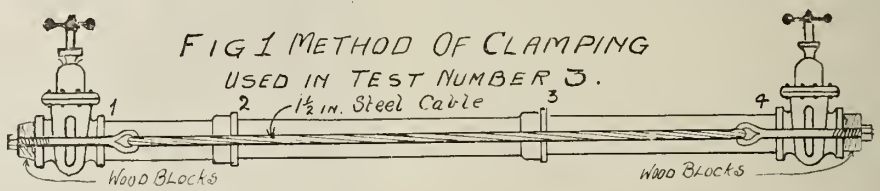
Pressure	Joint No. 1 Run Lead	Joint No. 2 Lead Wool	Joint No. 3 Run Lead	Joint No. 4 Lead Wool
110 lbs.	Sweating slightly	Sound	Sound	Sound
125 lbs.	Sweating freely	Sound	Sound	Sweating slightly
150 lbs.	Dripping freely	Sound	Sound	Sweating freely
200 lbs.	Dripping freely	Sound	Sound	Valve started to move off leaking freely
225 lbs.	Dripping freely	Sound	Sound	Valve moved off 2½ in., leaking freely

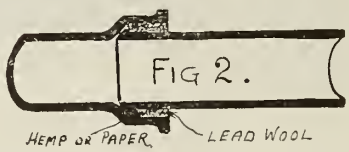
In the above test the protective solution was left on spigot and bell.

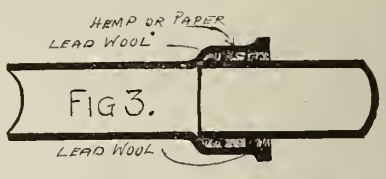
TEST No. 2.

Pressure	Joint No. 1 Run Lead	Joint No. 2 Lead Wool	Joint No. 3 Run Lead	Joint No. 4 Run Lead
110 lbs.	Sweating slightly	Sound	Sound	Sound
150 lbs.	Sweating	Sound	Sound	Sweating slightly
200 lbs.	Sweating freely	Sound	Sound	Valve jumped 1 inch, and leaking freely

The spigot at joint was cut off and solution left on.







TEST No. 3.

Pressure	Joint No. 1 Run Lead	Joint No. 2 Lead Wool	Joint No. 3 Run Lead	Joint No. 4 Lead Wool
200 lbs.	Sound	Sound	Sound	Sweating slightly
300 lbs.	Sweating slightly	Sound	Sound	Dripping
350 lbs.	Sweating freely	Sound	Sound	Running
400 lbs.	Moved ¼ in.	Moved ⅛ in., not leaking	Moved ¼ in., dripping	Running freely
450 lbs.	Lead started to blow	Sweating slightly	Moved 1 in.	Running freely but had not moved

Pipes were clamped in this test only, as shown on sketch. At 450 lbs. the pipe buckled at joint No. 3.

TEST No. 4.

Pressure	Joint No. 1 Run Lead	Joint No. 2 Run Lead	Joint No. 3 Run Lead	Joint No. 4 Run Lead
200 lbs.	Sound	Sound	Sound	Sweating
275 lbs.	Sound	Sweating freely	Sound	Sweating
290 lbs.	Sound	Jumped ¼ in., dripping	Sound	Sweating
300 lbs.	Sweating slightly	Dripping freely	Jumped ½ in., leaked badly	Dripping freely
340 lbs.	Sweating slightly	Dripping freely	Leaking badly and moving	Dripping freely
390 lbs.	Sweating slightly	Dripping freely	Moved 1 in., lead started to blow	Dripping freely

The spigot ends of all pipes were well scraped and brightened.

TEST No. 5.

Pressure	Joint No. 1 Run Lead	Joint No. 2 Run Lead	Joint No. 3 Run Lead	Joint No. 4 Run Lead
150 lbs.	Sweating slightly	Sound	Sound	Sound
200 lbs.	Sweating slightly	Sound	Sound	Sound
225 lbs.	Sweating freely	Sound	Sound	Sound
250 lbs	Sweating freely	Sound	Sound	Sound
275 lbs.	Sweating freely	Sound	Sweating slightly	Sound
290 lbs.	Sweating	Sound	Jumped 3-16 in.	Sound
340 lbs.	Sweating	Sound	Moved ¾ in., lead started to blow at bottom	Sound

In this test 1¾ in. to 2¼ in. of lead were used in each in each joint instead of from 2½ in. to 3¼ in. during the previous tests.

when one takes into consideration the fact that it does not require the same weight of lead wool as of molten lead, this objection can be ignored.

There is also another point in favor of lead wool for cast iron pipe joints. In winter time, when cast iron pipe is cold, there is a danger of cracking the pipe when the lead is poured, unless the hubs are first warmed.

The use of tarred oakum can be dispensed with when lead wool is used, and the lead can be caulked the full depth. This means that the caulked metal will be a better fit, and expanded to the walls of the pipe and hub, the full length of the joint, or nearly so.

These lead wool joints can be made in two ways. See Figs. 2 and 3. Fig. 2 being a joint with a small amount of hemp, or even newspaper first caulked well down, and filled up with lead wool.

Fig. 3 shows a joint made by first caulking about one-half inch of lead wool, then another ½ inch of hemp or paper, and filling up the hub with lead wool well caulked.

Regarding the molten lead joint, very little can be said. It has been a fairly successful joint. With certain limitations, like all joints, it cannot, of course, be made where there is the slightest moisture present. Inverted joints cannot be made under any condition, and if a joint is badly poured nothing can be done with it, but cut it out and re-pour it. Furthermore, while the poured joint is to a certain extent flexible, vibration of ground will not injure, or cause such a joint to leak. Yet if, say, for instance, a real strain were put on the pipe at the joint, it would be much more apt to leak than would a joint made with lead wool.

It must, however, be understood that we are not by any means advocating the lead wool joint indiscriminately, but simply showing that lead wool should be a part of the regular stock carried by sanitary engineers, that under certain conditions it can be used very advantageously, and results in a saving of time, material, and is perfectly safe for making joints even under water.

B.O.T. Mfg. Co. Changes Hands

Canadian Brass Mfg. Co., Galt, Takes Over the B.O.T. Mfg. Co., Toronto—Reorganization of Management—a Splendid Combination That Will Benefit the Trade and Become a Far More Valuable Source of Supply — Head Offices Now at Galt, Ontario.

THIS is indeed a day of surprises for the sanitary and heating engineering trade; pleasant, too, to say the least. Changes are taking place of a highly constructional nature. Concerns are amalgamating at a pretty rapid rate, all with a view to increasing output, creating greater efficiency and giving increased service to the trade.

The most recent change of ownership is that the Canadian Brass Mfg. Co., Galt, acquires the ownership of the B. O T. Mfg. Co., Toronto. Both these concerns have earned very creditable reputations for high-grade quality goods, as well as dependable service.

The B. O. T. Company was established in the year 1910, only a matter of 7 years ago. Mr. B. O. Tilden, the inventor of the B. O. T. w.c. combinations, has long been acknowledged to be an authority on all kinds of w.c. bowl constructions, and the combinations furnished to the trade have for some years been looked upon as goods that have deserved and earned every credit.

The personnel of the company, under the able management of Trevor Hawgood, earned no small amount of respect from a large clientele.

As Mr. Tilden became a stockholder and director in the Canadian Brass Company, it was quite logical to see a possible absorption of the B. O. T. Company by some senior and longer-established company. This move took place very recently. When the Canadian Brass Company absorbed the concern referred to, the latter was progressing splendidly, as also was the Canadian Brass Co., and the amalgamation of the two concerns will no doubt make as desirable a source of supply as could be wished.

The Canadian Brass Mfg. Co. was organized in the year 1907 to manufacture a full line of water works and sanitary plumbing brass goods. Their lines are made exclusively of red brass, under the expert guidance of a practical brass founder, Mr. H. Leddon.

The management of this concern was assumed by G. E. Fisher in December, 1915. Mr. Fisher was employed for some twelve years with the Canadian Fairbanks-Morse Co., in charge of the pump, electric and gas engine sales department, and was held in high esteem by a large circle of business men with whom he came in contact. To make good and be in the employ of such a company for twelve years has fitted Mr. Fisher with such qualifications as cannot help but prove a source of great assistance to him in this his still greater venture.

BOARD OF DIRECTORS

President, G. A. Dobbie, Galt.

Vice-President, S. F. Scott, M.P.

Directors—F. A. Scott and H. Leddon, B. O. Tilden.

Managing Director and Secretary-Treasurer, G. E. Fisher.

Toronto Manager, Trevor Hawgood.

The Canadian Brass Co. started with a very modest, yet up-to-date equipment, that has from time to time been added to, so as to enable the company to cope with the increased demand for their product.

Since the war broke out their factory has been busy on war material, and has now begun to concentrate more on their regular lines, and, as they had no Toronto branch, the acquiring of such an addition appeared to be very desirable.

The head office of the company will still be at Galt, as was the case before, and the B. O. T. Mfg. Company ceases to exist.

The office and address is the same, but will from now on be known as the Toronto Branch of the Canadian Brass Mfg. Co., Ltd., Galt. Mr. T. Hawgood will officiate as branch manager, with G. E. Fisher, general manager and secretary-treasurer.

The accompanying panel contains a complete list of the directors of the company.

POWER TO ACCOMPLISH

The more complete and extensive a man's education, the more able is he to accomplish whatever he undertakes. Each part and power of man is educatable. The educated hand is strong, steady, active, graceful and sensitive. The educated eye is alert, telescopic, microscopic, discriminating, capable of many tasks, accomplished in many arts. The educated memory is comprehensive, unconfused, accurate, retentive, quick. The educated reason is ready, logical, tranquil, profound, masterly.

The educated affections are tender, constant, vigilant to seek and do their office, beautiful and robust. The educated will is decisive, prompt, unwavering; immovable in its rest, irresistible in its God-like motion.

An educated man is a grand congerie of organs and forces, material and spiritual, working together in health and harmony, mutually dependent, mutually helpful—many in one—subordinate only to Him who is supreme.

To educate a man is to give his hand, brain and heart their maximum life, power and facility.

"Know thyself" is the theoretical end of education; use thyself is the practical end. The Orient said know and be; the Occident says, know, be, and do.—W. H. Venable.

Sixth Annual Executive Meeting

OF THE

Ontario Society of Domestic Sanitary and Heating Engineers

Will be held on FRIDAY, April 27th, 1917, at 10.00 A.M., in Canadian Forester's Building, 22 College Street, TORONTO.

As a result of a referendum vote, taken of the members, the ANNUAL MEETING of the Ontario Society will be dispensed with this year, and in its place a General Meeting of the Executive Committee will be held as above.

The Directors, Honorary Directors, Trustees, Auditors, Chairmen of Committees and Representatives from each locality throughout the Province will be in attendance; also the Executive Officers of the Canadian Society, as well as numerous other members, who have signified their intention to be present on this occasion.

While the holding of an Annual Meeting was considered unnecessary from an economical standpoint, and for reasons of the unsettled condition of the trade generally, the Directors have nevertheless deemed it advisable to call the attention of every member of the Society to the many unsatisfactory conditions that are so prevalent among our craft at the present time, and which require the most drastic action on the part of every one of us to counteract, so that our craft may continue to advance in its mechanical and scientific departments, and overcome the imposition and encroachment being enacted upon it from all quarters. The Directors therefore extend to the many members, and also to those who have not as yet become members, in the different communities throughout the Province, a cordial invitation to attend this meeting.

The following officers and members of the Executive Committee will report to the meeting in accordance with the subjects enumerated below.

Directors—Frank R. Maxwell, President, Toronto, Directors' Report.

Fred. H. Gentle, Vice-President, Toronto, Manufacturers' Report.

Thomas M. Maxwell, Treasurer, Toronto, Financial Report.

Secretary—Garrett F. Frankland, 1093 Bathurst Street, Toronto.

Honorary Directors—Ernest H. Russell, James R. Haslett and A. E. Gibbons, of London; William Mansell, Lewis LeGrow, George Clapperton and Harry Hicks, of Toronto.

Auditors—George Ross, Brockville; James R. Haslett, London; Fred. Smith, Guelph.

Trustees—E. H. Russell, London; Harry Mahoney, Guelph.

Sanitary Committee—Robert McG. Coyle, Chatham.

Heating Committee—Ben Noble, London.

Arbitration Committee—H. S. Brown, Brockville.

Legislation Committee—Angus McDonald, Stratford.

Apprenticeship Committee—Henry E. White, Brantford.

Educational Committee—George E. B. Grinyer, Guelph.

Examination Board—The Directors.

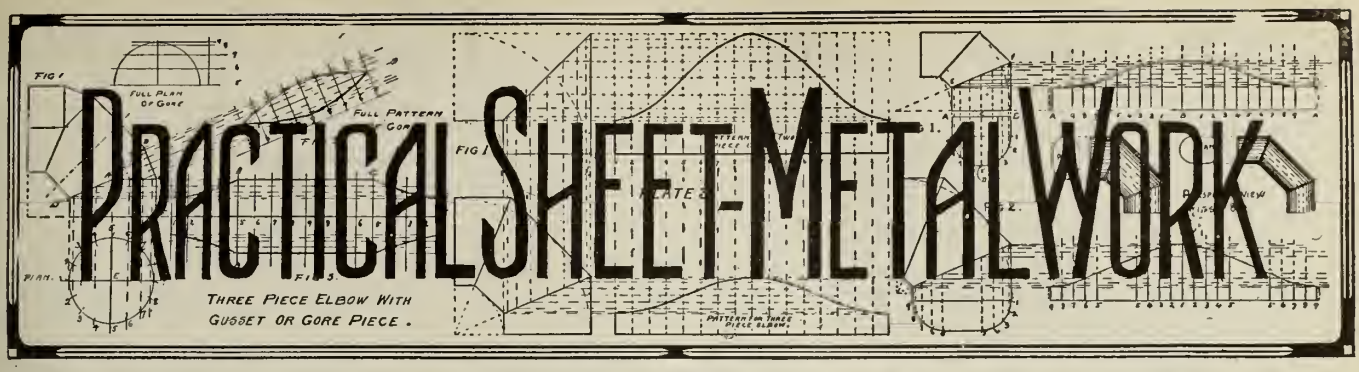
The Canadian Society Executive Officers, including President Alex. Charette, Montreal; Vice-President Clove R. Myers, Stratford; and L. J. Conroy, Secretary-Treasurer, Montreal, have been requested to attend in behalf of the trade throughout the Dominion, so that action taken will be both united and of a uniform character throughout Canada.

Full particulars and any information desired by the trade or members, will be willingly forwarded upon request.

Yours respectfully,

Frank R. Maxwell, President.

Garrett F. Frankland, Secretary,
1093 Bathurst St., Toronto.



BY THOMAS STANFIELD

IN this article is shown an elbow made up of five pieces, but in reality it is simply a regular three-piece elbow, the two extra pieces are gore pieces, or gussets. This style of elbow is often very convenient in ventilator work, and if carefully made, has a much neater appearance than the ordinary three-piece elbow. The writer has found it very convenient when a 5-piece elbow was required, particularly when a short throat was also necessary. Every tinsmith is aware how awkward it is to make a short-throated 5-piece elbow. To develop the patterns for this elbow, proceed as follows:

First draw an elevation, as shown in Fig. 1, which is done in the same way as when drawing the elevation of a three-piece elbow. From A draw parallel lines, as shown, to form the gone. A shows the perfect centre of the elbow.

Next connect these two lines as shown at B C. This will complete the gore. Line D forms one-half of the mitre, and must be extended as shown by the dotted line, which would take the place of a stretchout line for pattern of the gore piece. From point A draw a vertical line downward and with compasses draw a circle. This will be the plan of elbow.

Divide circle into equal parts, 1, 2, 3, 4, etc. Then erect dotted lines in the direction shown until they interest the various mitres which are necessary for both the pattern of gore and elbow. Then extend these lines from A C to A B. From the points developed, draw the dotted lines as shown which run parallel with dotted stretchout line D.

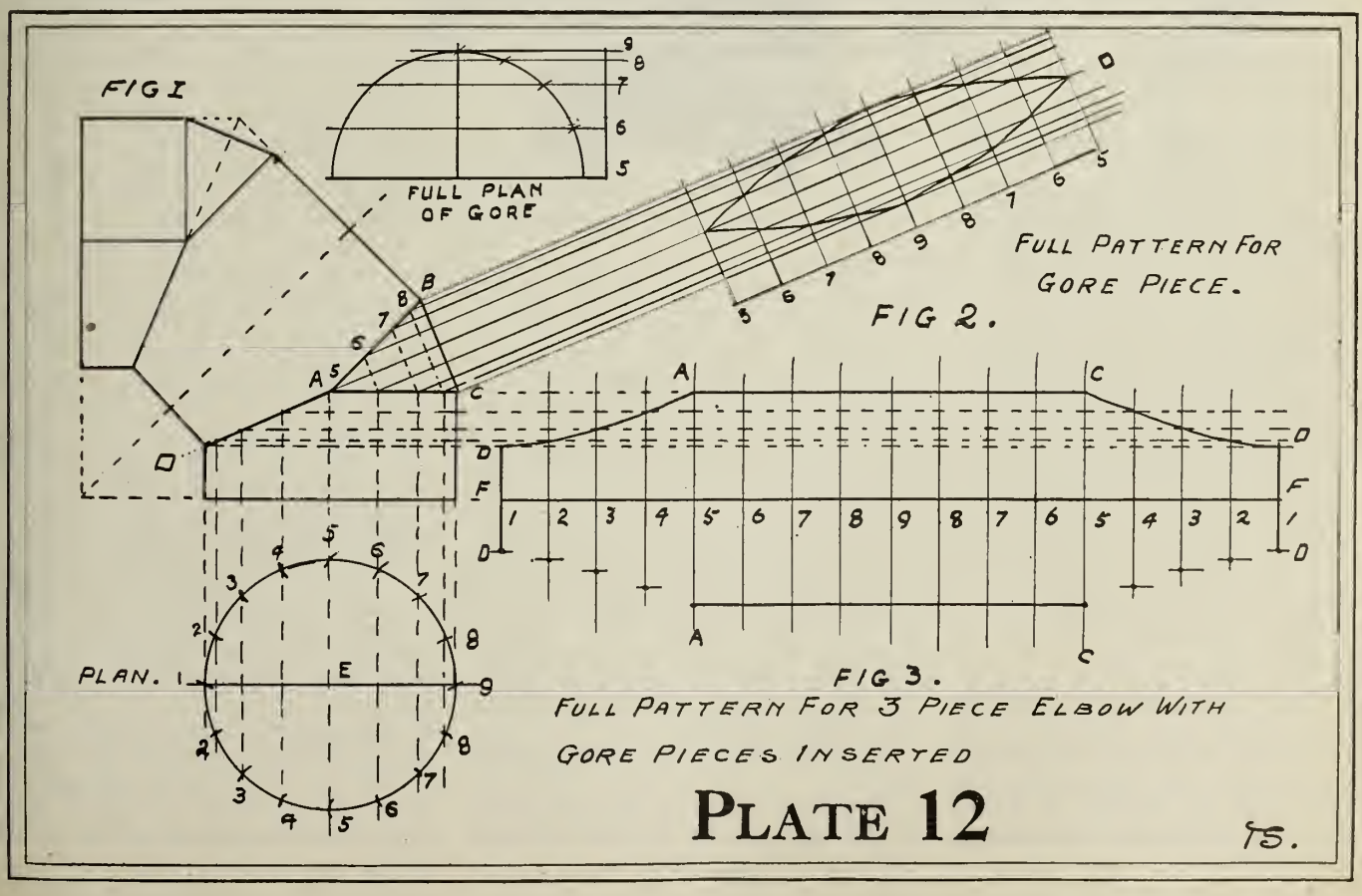
Next draw a solid line, Fig. 2, and transfer the points shown in plan of gore to the solid line, 5, 6, 7, 8, 9, 8, 7, 6, 5, this being the total length of the gore pattern. Erect solid lines from these latter figures which will then intersect all the dotted lines running parallel with centre dotted line D. At points of intersection is shown the pattern of gore.

Next draw line F. F. shown in Fig. 3. This is the stretchout for pattern of piece shown at D A C F F, Fig. 1.

Next transfer the measurements given in plan 1, 2, 3, 4, to the stretchout, Fig. 3. The next step is to draw a number of dotted lines parallel with the stretchout line F F and at points 1, 2, 3, 4, etc., erect solid lines. The points of intersection show the pattern of the elbow piece. In both the patterns, Fig. 2 and Fig. 3, the points of intersection should be connected when developing the drawing, or cut when developing the pattern.

If a 45-degree elbow is required it will only be necessary to cut one piece each of Fig. 2 and 3. Fig. 3 is then cut in two on line F. F. The dotted line shown through the centre of middle piece shows an elevation of a 45-degree elbow. No allowance has been made for seams.

(To be continued in next issue.)



Steam Traps, and How They Operate

Heating Engineers are Often Confronted With Steam Trap Troubles—The Following Article Will Prove Interesting to All — Many Important Questions Answered

By J. E. Swendeman, Mechanical Expert, American Steam Gauge & Valve Mfg. Company, Boston, Mass.

MOST heating engineers and steamfitters have from time to time experienced a certain amount of trouble with steam traps, more so recently than ever before, because of the fact that in days gone by steam when once having done duty in some form or other, was allowed to exhaust freely into the open.

Every day brings the facts more into evidence that steam is steam; it is just as valuable as is cash. Once steam is generated there is no sensible reason why it should be wasted while it is in the form of steam. Hot water, produced by condensation, is also valuable, providing there is some efficient method adopted to return it to the boiler.

In heating plants, particularly, it has been found that if the steam trap is properly installed and the most suitable trap for the occasion is chosen, a great saving can be effected. With the idea of better informing those persons who have to install and operate such appliances, Mr. Swendeman has written the following article:—

Q.—What is a steam trap?

A.—A steam trap is a device that collects the water of condensation from any piece of steam apparatus, and discharges the same to a tank or hot well without loss of steam.

Q.—What is the mechanical principle upon which all steam traps are constructed?

A.—The power of leverage.

Q.—Why is leverage required in a steam trap?

A.—To overcome the unbalanced pressure.

Q.—What is the unbalanced pressure?

A.—The area of the valve orifice open to the atmosphere.

Q.—How much leverage is required?

A.—This depends entirely on the area of the valve orifice in ratio to the pressure at the trap.

Q.—How are steam traps usually specified?

A.—By the pipe size connection and the pressure.

Q.—Is this the correct way?

A.—No.

Q.—Why not?

A.—The capacity of any steam trap depends entirely upon the area of the hole in its valve in ration to the pressure at the trap, and the size of the hole depends upon the leverage or pulling force of the mechanism employed to open the valve.

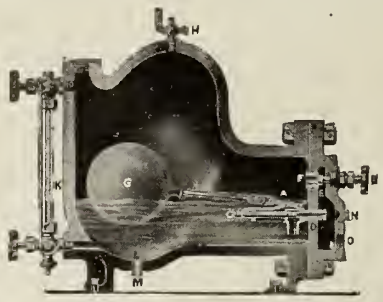
Q.—How should steam traps be specified?

A.—By the size of the valve orifice and the pressure.

Q.—How can this be illustrated?

A.—It is well known that many traps have failed to give satisfactory results, and this can generally be traced to the fact that many specify steam traps by the pipe size connection and the pressure, without giving full consideration to the size of hole in the valve seat. There are many cases where traps have been specified, and the purchaser was under the impression that the valve orifice was equal to the pipe connection.

To show how utterly mistaken this idea is, we will take the different types of float, pot, and bucket traps which are most commonly used. By examining the size orifice in the various traps having 1½ inch pipe connection for 250 pounds, you will seldom find one with an orifice greater than ¼ inch and some even smaller. To show this more plainly, take the area of a ¼ inch orifice, which is .049, divided into the area of a 1½ inch pipe connection, which is 1.7671, and it shows the pipe connection to be thirty-six times greater than the valve orifice. As the size orifice in the valve is always the capacity of every steam trap there can be no more water pass through the trap than will pass through the orifice.



Interior view of the American Ideal Trap.

Q.—Why is the valve orifice in some traps so much smaller than in others for the same pressure?

A.—Because every different make of trap has its own amount of leverage, and this governs entirely the size of orifice and consequent unbalanced pressure that it can overcome.

Q.—When does a trap become inoperative?

A.—When the area of the valve orifice is too large for the leverage available and the working pressure.

Q.—What is the remedy in such a case?

A.—Either cut down the working pressure to a point where it balances with the area of the valve orifice, or reduce the size of the valve orifice to a point which balances with the pressure in the trap.

Q.—What are the different forms of leverage used in steam traps?

A.—Float, simple pot, bucket, tilting, and expansion traps.

Q.—How can these types be described?

A.—First—The Float Type—The leverage in a float trap is, of course, operated by a float. The size of the orifice in a float trap depends on the size and weight of the float in ratio to the leverage and the pressure. Every float of a given size and weight has a certain buoyancy it will sustain without submerging. This displacement of two floats fully submerged, or equal diameter but of different weights, would be the same, but the lifting power of the lighter float would be more. In other words, a trap valve operating with a light float would open a larger orifice on a given pressure than a heavy float, which is the one and only reason for using the light float in any trap. Also, this is the reason why most floats collapse when submerged to a higher pressure than their thickness and strength will permit.

Q.—What would be the result of changing from the light float to a heavier one of the same size?

A.—To change from a lighter to a heavier float would mean to reduce the size of orifice in the valve to equal the buoyancy of the heavier float.

Q.—Why don't manufacturers use heavy floats in steam traps even though it does reduce the size of orifice somewhat?

A.—The only reason for not using a heavy float is that the orifice is already so small with the light float that to use a heavier float would mean to further reduce the size and of course its capacity. Perhaps nothing could explain this any better than reference to the accompanying illustration. Steam traps should be specified by size of orifice and pressure, which speaks of a 1½ inch trap for 250 pounds having a ¼ inch orifice, or pipe connection thirty-six times greater than the orifice; and to use less lifting power or pulling force would mean to further reduce the size of the ¼ inch orifice.

Second—The Simple Pot Type

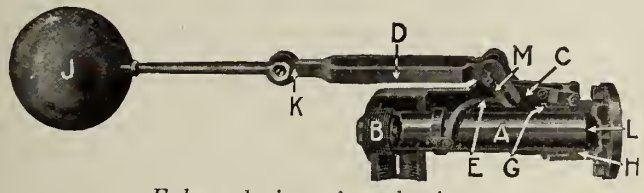
Every pot of a given size and weight has a certain buoyancy it will sustain without submerging, and the leverage or pulling force depends on the size and weight of the pot, and the amount of weight of water the pot holds, to pull the valve off its seat. The size of the orifice depends, of course, on the pulling force of the pot, as stated, in ratio to the pressure at the trap.

Third—The Bucket Type

The operation of the bucket trap and its principles of construction are similar to the float trap, and it is often called "open float." The fact that it is an open float or bucket gives it an intermittent discharge. Its power of leverage and operation is similar to the simple pot except that the pot pulls from the centre, and the bucket trap has a slight advantage over the simple pot when the pot and bucket are of the same cubical area, due to the fact that the bucket has a slight leverage.

Fourth—The Tilting Type

This form of trap is similar in operation to the simple pot and bucket traps inasmuch as it gives an intermittent discharge. The valve orifice in this type of trap is much larger than is found in the ordinary pot or bucket traps. This is due wholly to the size of the bowl, which holds a larger amount of water, thus giving it a greater pulling force, and also the distance of the heavy bowl from it fulcrum.



Enlarged view of mechanism.

Fifth—Expansion Traps

Expansion traps are made in many forms, but the principle is one and the same. Its leverage or pulling force is the power of expansion of metals.

Operation of Steam Traps

Steam traps operate two ways, either continuously or intermittently.

In the continuous discharge steam trap the condensation is discharged as fast as it enters the trap, while the intermittent or dumping trap, as it is sometimes called, discharges its condensation at intervals, the time between the intervals depending on the size of the trap for the work it is doing. This may be so closely rated to its maximum capacity that it is practically operating continuously.

Failure in the Operation of Steam Traps

Although high pressures are the severest tests on steam trap valves, as regards their continued tightness, from a point of actually handling the condensation on high pressures, there are many less failures than on low pressures.

There are many conditions arising on low pressure service which make many traps unsuited for the service. The first is lack of capacity due to the size hole in the valve. Also, owing to the low pressure the steam is more saturated and condenses more rapidly, and many times is wholly condensed before reaching the trap.

When traps are working on low pressures, say five pounds and less, there is great possibility of the trap getting more or less air, which has a tendency to retard the flow of condensation to the trap. In such cases the trap should be equipped with a suitable automatic air valve, and should be set to close at or near the maximum pressure of the trap.

Remember that every time a trap cools down, before putting the trap in service again the air valve should be opened and left open until the steam escapes; meaning, of course, all traps not equipped with automatic air valves.

In connecting a steam trap on low pressure service or apparatus the condensation should flow to the trap by gravity, and should also discharge by gravity to the tank or hot well. Any rise in the discharge line or deviation from this rule will cause a back pressure in the discharge line, and will retard the flow from the trap. If the trap should be working on atmospheric pressure with any back pressure in your discharge line your trap would fill and the condensation would back up into the system or apparatus.

It is safe to say there are more failures in selecting a steam trap by the rating in lineal feet than by any other means.

The reason there can be no fixed rating for all steam pressures and all services is that every rating in lineal feet must have some ratio of condensation per lineal foot per hour. This ratio or allowance should be stated. The ratio of condensation per lineal foot per hour will depend on the pressure, service, and exposure, and no two conditions are exactly alike. The ratio may vary from two to forty ounces per lineal foot per hour, according to the size of the pipe, the pressure, service, and exposure.

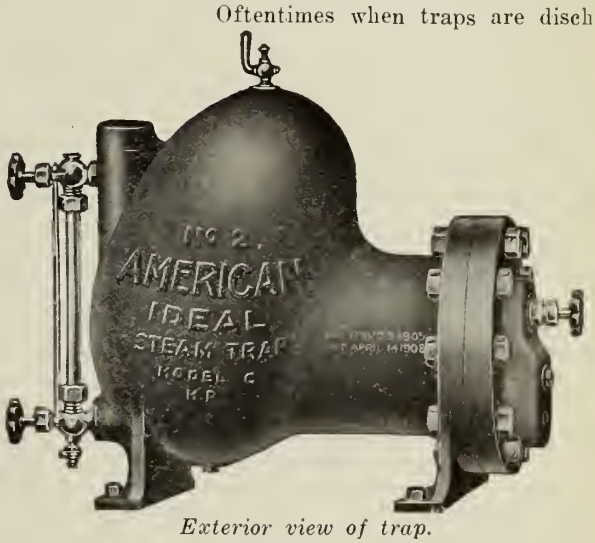
The formula for finding the allowance of condensation per lineal foot per hour of any steam trap would be to compute the condensation of pounds per hour into ounces, then divide by the rating in lineal feet. The result would be the ration of condensation per lineal foot per hour.

Noise or Water-Hammer from Steam Traps

This condition is only found in the use of intermittent steam traps, caused by the trap discharging intermittently. This permits the discharge line to cool off somewhat between the intervals of discharge, causing a difference in temperature between the condensation and the pipes.

Vapor from Steam

Oftentimes when traps are discharging into the atmosphere there is considerable vapor arising from the condensation, and this is very often taken for steam. This vapor is due to the difference in temperature between the condensation and atmosphere, and the colder the atmosphere the more pronounced is the vapor. When in doubt as to its being vapor or steam examine the valve seats. It is never steam with tight valves. This operation of examining valve seats is unnecessary with the float or continuous discharge steam trap, as this type of trap is generally fitted with water gauge. If not, it can and should be so equipped. This type of trap is intended to carry a water seal, meaning that the valve is always under water, and the steam being above water there can be no steam get to the valve, as the water seal would first have to be blown out before the steam could follow. Therefore, that water gauge acts as a watch dog for your trap, and the glass immediately shows, not only if the valve seats are leaking, but also whether the trap is handling all the condensation coming to it. If the valve seats are leaking, there will be no water in the glass. The opera-



Exterior view of trap.

tion and construction of the intermittent trap is such as not to make it adaptable for the use of a water gauge, and it would, therefore necessitate the inspection of the valve seats to determine if they are leaking.

Wiredrawing in Steam Traps

Opinions vary as regards wiredrawing in steam traps. It is commonly said by many that continuous discharge steam traps wiredraw, and this argument is set forth by those who sell and manufacture intermittent traps, the claim being made that the valve being partly cracked off its seat causes the valve to wiredraw, and unless one looks deeper into this claim it does look so. The argument set forth is that cracking a steam valve off its seat would, of course, wiredraw. This is true, but what relation has this with a valve cracked in a steam trap?

There is a vast difference between the two. With one you are cracking steam; with the other you are cracking hot water.

Compare these two conditions with similar conditions in your own plant. An instance would be the steam valve controlling your feed water pump with the feed water valves on your boiler, both cracked off the seat more or less all the time. How often does the valve on the boiler need reseating as compared with the controlling steam valve on the pump? Perhaps you may have several other similar conditions in your plant.

It has been thoroughly demonstrated by actual tests that an absolutely tight valve water sealed will outlast and outwear any other type of steam trap valve. It is not to be wondered at that this argument is advanced on the continuous discharge steam traps, owing to the fact that many compare the two conditions as being the same.

Let us look into the cause of wiredrawing, and compare the conditions of the various types of steam traps.

The intermittent argument is that the valve is either wide open or tightly closed and cannot wiredraw; also that the valve is at the top where the dirt and grit cannot get to it. How long does such a valve last? This, of course, would depend on the pressure. Is not the talking point of this type of trap generally the accessibility with which valve seats can be renewed? In view of the argument set forth why should this be necessary? If there is no wiredrawing, why are renewals necessary?

The "wide open" and "tightly closed" argument is a misleading one, and cannot be borne out by any sound comparisons, when really exhaustive tests have proven to the contrary. The operation of the intermittent trap and its "wide open" argument can well be compared with the blow-off valve on a boiler. The blow-off valve is water sealed and is operated only a few times a day. The work is so severe that it is hard for the valve seats to remain tight any great length of time.

The action of the intermittent trap is similar to that of the blow-off valve, except that the trap may operate several hundred times a day, according to its size for the work it is doing; and, in fact, if the trap is working at its maximum, it is practically discharging continuously.

We have tried to offer some good reasons for the above facts, and the only argument to be set forth is that when the valve is wide open the unrestricted orifice permits the condensation at a high temperature to escape with such velocity as to cause a sand-blast action against the valve seats, which causes the edges of the valve seats to wear and not wiredraw; but after the valve seats have become worn, then they immediately leak, losing the water seal; then steam follows and wiredrawing takes place. There is but little force to the discharge from a continuous discharge steam trap with the valve cracked off its seat, and the force increases as the valve opens to its maximum area.

Did you ever examine the valve seats of any leaky trap? If so, what was the result? Wiredrawing, of course. The wide open or tightly closed argument does not hold in a single instance.

In almost every continuous discharge steam trap the valve is water sealed, and providing the valves are tight, steam cannot get to it; but the continued tightness of any valve depends wholly on the kind of metals used in the valve seats eliminating the possibility of the valve leaking through scale becoming lodged under the seat.

When you buy an intermittent steam trap you get the wide open or tightly closed argument.

When you buy a continuous discharge steam trap you get the argument that the valve is water sealed.

When valve seats leak, they are wiredrawn. It cannot be otherwise.

What is the excuse offered in either case? Scale, of course (a good excuse for either type); but scale is not always the cause. Many times it is the construction of the valve, which was never tight and cannot be made tight.

The test of a trap valve for tightness is most severe when the trap is doing the least work. A slight leak in the valve will then soon discharge its water seal and steam naturally follows; then wiredrawing takes place, and not until then. As long as the condensation coming to the trap is greater than the leak, steam does not get to the valve. The higher the pressure the more severe the test. A high pressure test will demonstrate the tightness of a valve in a few hours, when it would take days or weeks on low pressure.

In making casual inquiries regarding the different types of traps, and the frequency with which their valve seats require renewals, it has been found that the smaller the orifice the more frequent are the renewals. The only good reason that can be advanced for this is that the small orifices, say 1-32 inch, ⅛ inch, or 3-16 inch, are so small that even the minute particles of sediment, much less scale, cannot pass through the valve orifice and must consequently lodge at the valve seats.

In order to eliminate the scale excuse to a large extent, never buy a steam trap for any service, no matter how little the condensation may be, unless the valve orifice is of sufficient area to permit the discharge of at least the small particles of scale or sediment. This should never be less than ¼ inch for any service.

LINKS IN A CHAIN

If you were going to make a chain, Mr. Reader with which to haul a load that had taken you a life time to acquire, would you not take great care to select the best steel, from which to make each link, or would you simply buy steel that appeared to be the same, same diameter, etc.? No, you would want to be sure that the material be uniform and of the best. Steel of a well tested analysis, steel that had previously proved to be the best, so that the chain would be uniform and equally strong in every link. Now, what value has the above story to the sanitary and heating engineer? In fact to every businessman.

Just this, the goods you buy and sell are the links in your business, the service you give your customer, and the service which the goods you sell is giving your customer.

Those goods, and the service, are so many links, and a poor ball cock, cheap radiator valve, the highly polished and nickel plated bulb, gotten up for sale are the links with which many sanitary engineers have tried to build up a business chain that connected them with their customers. But these cheap gotten-up-for-sale gave out, and the connection between them and their customer was severed, could anything else be expected?

In good old England, that land of democracy's birth, when you buy a gold or silver watch chain, every link is stamped, with a ball mark. What does that mean? That every link is silver, or gold through and through.

Why not build up your business and your reputation upon goods that bear the maker's name, buy goods that are advertised and only those, you will then be assured of a strong and lasting connection with your customers. See that every article you sell is marked with a name that devotes high-grade quality. Built for service.

Clay Tile Pipe vs. Cast Iron Soil Pipe

No Expense Should be Spared to Safeguard the Health of the Occupants of a Building—Experience Proves That Tile Pipe is Not the Most Desirable Kind to use—Drain Diggers and Incompetent Men Only, Advise Its Use—While Actual Practice Proves Otherwise—The Public are More Interested in Safety Than Cents

THE question of the use of clay tile pipe under dwellings, as compared with the use of cast iron soil pipe, is still being hotly contested, though not producing any phenomenally weighty arguments on the part of the tile pipe supporters. The continuation of the discussion is rather to be accredited to their endeavor to set aside the clauses of the by-laws of several towns which demands that cast iron soil pipe be installed under buildings. The main arguments of the tile pipe supporters are based on a matter of cost, and these arguments are being constantly re-hashed, even though nothing could be more evident than that in doing so, sanitary conditions are being sacrificed for price, and the health of the people of the communities whose laws are being threatened, is at stake, while they are being misled by those seeking to change the laws.

In one of the most glaring cases of this latter unfortunate state of affairs, namely, Burlington, Ontario, the campaign is reaching its climax, and the tile supporters, led by Mr. H. Cleaver, are striving to put their own considerations before the interests of the townspeople and keeping dark the pictured result of the use of tile pipe. This action consists of nothing less than openly supporting a plan to allow the excavations of the town to become a cesspool of decomposed filth through the leakage of the drainage system which accompanies the use of anything but cast iron soil pipe. We regret to have to say that already the town of Windsor has adopted clay tile pipe, making it optional. This decision will no doubt be contested. It is a case of fools traveling the road where angels fear to tread.

In their effort to misguide the people of the town, whose main idea has been to put health and sanitation first, one illustrious person professing to be an engineer, has exhibited in his show window a portion of an iron syphon pipe taken from a septic tank. To the amateur, the specimen of pipe conveys the idea of corrosion, and what is thought to be a vivid demonstration of the preference for the use of tile, is the comparison with a portion of tile pipe which formed the trap at the base of the tank. It is unfortunate that all the dwellers in this fair Ontario town are not expert enough to judge for themselves, without having to take the biased opinion of an interested party, but for their benefit it can be explained herewith that far from being corroded, the pipe is simply covered with a formation of filth from the solid matter in the tank. Proof of this assertion is based on the fact that the portion of the pipe which was protected with lead solder is cleaner and appears thinner than the main portion of the pipe which is said to be corroded. If corrosion had been the cause the conditions would be exactly the reverse. Another feature which enters into the situation is that the iron pipe, because of its position in the tank, was exposed to the air, while the tile drain was constantly under water, and being constantly flushed. If the foregoing example is the best the supporters of the tile pipe in Burlington can offer, then it will be conceded they have a very weak case, and one upon which breath should not be wasted for discussion.

Further arguments in support of using cast iron soil pipe in preference to the tile, are contained in the unanimous opinion of sanitary engineers throughout the country, as voiced in replies to the letter recently sent out by SANITARY ENGINEER. A number of these replies were reprinted in a previous issue, but so decided has been the general opinion of experts, that we think it worth printing further replies. The letter was sent out to a large number of men in different parts of the Dominion, and the following questions were asked:

1. Do you favor the use of clay tile pipe under dwellings or buildings? If so, why?

2. Do you favor the use of cast iron soil pipe (medium or extra heavy) under dwellings or buildings? If so, why?

3. What is the law regarding above questions in your town?

The unanimous opinion as expressed in replies is in favor of the cast iron pipe, and the opinion is representative of every part of the Dominion. Some further replies are as follows:—

Vancouver, B.C.

The first reply from British Columbia emphatically condemns the tile pipe in the following answers:—

1. No. After 22 years of plumbing, I find tile sewers under a dwelling to be a nuisance. I always find the cement joints leaky or broken.

2. If medium iron soil pipe is well coated, I find no reason why it should not be used in dwellings or buildings.

3. The by-laws allow for medium iron soil pipe to be laid five feet past the house or dwelling, no tile pipe allowed inside the buildings.—J. P. Y.

Saskatoon, Sask

1. No. Clay tile pipe is liable to fracture both in itself and its joints from crushing under the weight of buildings and unequal settlement from trapping by the thrusting up of the enclosed portion of earth by the super-imposed weight of the walls.

2. Yes. Drains should be constructed of extra heavy cast iron soil pipe so that they will not be so liable to fracture, etc. (from settlement of buildings), in themselves or their joints. Iron drains also better resist loss of alignment from various causes.

3. All soil, waste, vent and drain pipes underground shall be of extra heavy cast iron pipes, coated inside and out with linseed oil, and after being inspected, tested and passed, coated with pitch or asphaltum.—H. C. N.

The following reply is from a plumbing and sewer inspector of Winnipeg:—

1. No.

2. Yes. Medium up to 4 inch piping and extra heavy over 4-inch. Because of its greater stability both in piping and jointing.

3. All drains under buildings must be of cast iron piping and extend 8 feet beyond the wall of the building.—H. S. S.

A well-known sanitary engineer of Lethbridge, Alta., and one whose opinion is an authority, has been watching the discussion in Burlington with great interest, and in his reply he states that the cast iron pipe is always preferable and that the only time when clay tile pipe can be used at all is when it is laid on a cement base with all joints caulked with hemp or oakum and cemented. This operation would be more costly than the use of cast iron pipe, and he is convinced that Mr. Cleaver would find the installation of properly laid clay tile pipe more costly than the use of the admittedly superior iron pipe.

Some further replies from Ontario have been received, including one very much to the point from London, as follows:—

1. No. Nothing whatever in its favor; it is not even cheap.

2. Yes. Because it is most permanent. Roots cannot enter the joints, and it is practically free from leakage. It cannot readily be cut into by amateurs and does not readily get out of alignment. It is, in addition, not likely to be fractured by earth settling or the action of acid.

3. "No tile shall be run through or under the wall of any building, and soil pipes within the walls of any building shall be of iron or brass."—E. H. R.

Another letter was received, which reads as follows:—

American School of Correspondence,
Drexel Ave. and 58th Street,
Chicago.

"Dear Mr. Editor.—I have a copy of your excellent publication on my desk,

and have read the controversy on Clay Tile Pipe vs. Cast Iron.

"After a careful perusal of same, I rubbed my eyes and gazed long and earnestly at the calendar to try and convince myself that this was really the year 1917.

"The question is so very old and has been threshed out so carefully in bygone ages that any alderman or any individual, not financially interested in the clay pipe industry, cannot for a single moment consider clay pipe drains inside buildings.

"Is the Canadian public behind the times, or what seems to be the trouble?

"All sanitary drains should be made of cast iron with lead joints within the feet beyond the outside walls, or when running parallel to a wall on the outside of the building within this danger zone of 4 to 5 feet.

In Paris and other parts of France it is practically the same.

"As a young fellow in Great Britain, I have assisted numerous civil engineers and sanitary specialists in their sanitary surveys, but in no instance can I recall anything but heavy cast iron pipe being specified for all drains inside and outside the building. At a later date I had miles of clay pipe drains torn up and heavy cast iron substituted for them.

"In the United States, generally speaking, all states have codes stipulating cast iron drains, and one of the latest, drawn up and passed by Congress for the District of Columbia, reads as follows:—

"'All house sewers shall be constructed of extra heavy cast iron soil pipe from the junction with the public sewer to its terminal in the building or lot.'

"Of course, I could tell you the reasons for the choice, but you would not care to hear them. It's old stuff which you have known for many, many years.

"Here's my best wishes for the success of the SANITARY ENGINEER.

"Sincerely yours,
"ARTHUR BATEMAN,
"Head, Sanitary Dept."

The following is a communication from West Fort William. The writer, as we understand, refers to invoice cost. We publish the letter in full, which also refers to the by-law in West Fort William:—

Mr. Editor:

In reply to yours asking my opinion respecting the drainage, etc.

Firstly,—Do I favor the use of clay tile pipe under dwellings or buildings? No, emphatically no. The reason why? Tile drainage is far more costly if carried out in accordance with existing by-laws in different parts of the world.

Tile drains are subjected to sagging, vibration, seepings, etc., if not installed strictly according to the by-laws.

If tile drainage is installed in any old way, that is to say, thrown into the ground on maiden earth there is the possibility of the pipes sagging through running waters, leaks and surface waters, breaking and cracking through vibration, settlement of buildings, etc.; which is a grave danger to the general public and should under all circumstances be avoided.

I have here enclosed you an approximate statement of cost of installing drains in tile and medium soil pipe showing the difference of installation if carried out in accordance with the by-laws.

I have also submitted a specification and cost of same in accordance with the by-law for laying a 30-ft. drain under dwelling house or buildings.

DETAILED STATEMENT.

Medium Soil Pipe.

Approximate cost of 30 ft. drain:	
30 ft. of 4" medium soil pipe 32c per ft.	$ 9.60
12 lbs. caulking lead, 12c per lb.	1.44
Oakum, 3 lbs., 7c per lb.	.21
Half-gal. gasoline	.20
Plumber's time, 4 hours @ 55c per hour	2.20
	$13.65

Add 20 per cent. for extra heavy soil pipe.

Tile Statement.

Approximate cost of 30 ft. drain:	
15 2 ft. lengths of 4" tile 20c per ft.	$ 6.00
3 yds. of ballast or shingle $2.00 per yd.	6.00
3 lb bags of Portland cement, 75c. per bag	2.25
2 lbs. rope oakum, 7c per lb.	.14
Cartage	1.00
Time for excavating, testing, and laying of pipes, 30 hours at 30c per hour	9.00
	$24.39

Specification for Laying Clay Tile Pipe

"A trench shall be excavated to a mean depth of 2 ft. with a grade not less than 2 in 50. The whole of the grade to be laid and covered with 6 in. of good ballast or shingle concrete, the pipes to be laid in centre of concrete floor of trench. A 6 in. concrete filling on both sides and 4 in. to 6 in. filling on top when finished. The pipes to have a grade not less than 1 in 50. The pipes must be free from fire cracks, flaws or fractures.

"The joints to be bound with rope oakum, and finished with neat Portland cement, trowelled to a glazed finish.

"After being placed into position pipes shall be sponged thoroughly throughout and given a water test not less than 25 to 30 lbs. pressure before filling in of concrete or top dressing A further test by smoke as a final test. If the above specification is not closely adhered to there is the possibility of the pipe becoming clogged caused by the running of cement joints causing what is known as teeth or tears to form on the interior of pipes causing obstruction and so clogging up of the drains."

I might state that the above specification governing the laying of tile drainage is taken from by-laws in different parts of the world where I have installed tile drainage, which of latter years has been discontinued and iron pipe installed. in preference. It was found far more economical, and far more satisfactory, both to the sanitary engineer and public. One thing I should like to advocate strongly would be to give all pipes (iron) installed in ground, to be covered, a strong solution of pitch or tar or other composition to prevent rust or corrosion.

Your last question concerning by-laws of this city. We do not permit tile drainage inside of any dwelling or buildings whatsoever, only exterior connections to main sewer.

W. B.,

West Fort William, Ont.

It will be seen that our correspondent has given the matter under consideration a lot of serious thought, and his arguments should be very convincing to those who are not quite sure of their ground.

Brockville, Ont.—1. No. I have found a good many tile pipes broken at wall where building settles, also at the joints in trenches. I would also say that there has been a lot of trouble here where the tile is not properly laid and sewage leaks out.

2.—I am in favor of cast iron pipe in every way it is the only pipe to use to make a first class job.

3.—We have to carry extra heavy pipe from a point 3 feet outside of wall up to the highest fixture. then medium up through the roof. We have had this by-law in force here nearly 25 years. Toronto is away behind.—H.S.B.

Moncton, N. B.—1. No because tile pipes are not as water tight, air tight or

(Continued on page 37.)

Create New Business, and How

Spring Time is Planning Time—People Who Expect to Build are Planning Now — Where and How Sanitary and Heating Engineers Can Help, and Create New Substantial Profits as Well as Render Lasting Service That Will Be Appreciated Long After the Cost Has Been Forgotten

IT is an old, though nevertheless true, saying, that sanitary and heating engineers, while being the best mechanics as a whole, lack in no small degree the art of salesmanship.

During the last week or two this truism has been brought home to the writer in a very forcible manner, in at least two cases.

Visiting a certain Western city recently, the high cost of material was being discussed by those present in a certain jobber's establishment. One of the jobber's representatives declared that the high prices were driving the hot water and steam heating systems off the market, and to prove this assertion he related where a friend of his about to build a $12,000 house had decided to install a warm air furnace because of first cost; that the architect had sanctioned it, agreeing that a warm air furnace would result in a bit of first cost saving, etc., etc. The writer could not procure the name of "that friend," or there might have been a different story to tell. But it would be interesting to know how the sanitary engineer that procured the sanitary fixtures took the matter up.

One thing cannot be disputed, and that is, that this home builder lacks a good practical friend; one who can show him that most warm air furnaces are only miserable apologies for furnaces; that if the local boards of health were interested more in preventing tuberculosis than in curing it, there would be new laws made regarding the installation of heating systems; and, furthermore, if our medical health boards were to look into the war air heating systems as at present installed, very few such furnaces would be allowed to take the place of proper sanitary heating systems.

Just imagine, readers, a $12,000 house containing a warm air furnace! The idea is preposterous. Now, who was responsible for this? First, the architect, no doubt, for allowing too much money to be expended upon frills that are not indispensable, thus leaving very little for the heating and plumbing. How is it that most other matters, such as style of architecture, number of rooms, kind of floors, design of stairs, shape of windows, etc., etc.. are all decided upon, and then what is left has to suffice for the plumbing and heating?

Because in the first place, the architect is interested in design and architecture, in getting a nice-looking house, with good-looking floors, stairways, etc.

The sanitary and heating is left, as we said before, and when the sanitary and heating engineer sends in his quotation, "he is a robber." He is trying to "put one over," and so on. But such is not the case. What is wanted here in such a case is that the sanitary and heating engineer should interview the owner. Never mind the architect; go to the owner and state your case, point out that a warm air furnace is at best only an apology for a heating system; that they are dusty, cannot be kept gas-proof, and give too many chances for fires. The basements are filled with a lot of big rustable pipes that have to be renewed. Air all has to come in contact with hot fire pot, thus burning out all its vitality, and making it unfit for human consumption, and a thousand-and-one other things that make most warm air furnaces veritable generators of bronchial diseases, etc., etc.

The sanitary and heating engineer of Canada has a responsibility to carry. He is interested in the prevention of diseases, not in their cure. He should, therefore, take such matters up with the owner, and show why no appliance is too good for the home, that place where we spend at least two-fifths of our lives.

The architect is forgotten nearly as soon as the house is built, but not so with the sanitary and heating engineer, because his work is of every-day importance. It is necessary at every turn to a much greater extent than the work of any other tradesman, and is more important.

Now, let us turn to another case which came to the notice of the writer. A certain architect in Toronto was asked to prepare plans for a private residence, the cost amounting to about $8,500. Tenders were called, and finally a bulk contract was about to be given the work, the owner thinking that this would be the best way, after consulting the architect.

A few days elapsed, when a friend of the owner happened to hear he was about to build a home, and, as the friend was interested in the plumbing and heating supply business, he naturally asked, "Who's doing the plumbing and heating?" The home builder replied that he did not know. Again the question was asked, "How much are you paying for the plumbing and heating?" Again the reply was that he didn't know; and upon being told to take great care in the selection of his plumbing fixtures, the furnace, and, above all, to see that a reputable sanitary and heating engineer be given the work, our home builder again consulted his architect, only to be informed that the plumbing was to cost around $200, and less than that for the heating—a warm air furnace, the architect being perfectly satisfied that the prices were right, and that the material would be O.K.

Again, did our plumbing and heating supply man get another look in, with what results? The architect was relieved of the plumbing and heating work, and a beautiful bathroom is being fitted up, the best, or rather most serviceable, of fixtures, and a good modern heating system is being installed, and the two combined are to cost in the neighborhood of $1,300.

This man is going to have a home that will be a comfort; a home that will cost less to keep up, very few repairs, and a great deal more service; a home which any housewife will be proud of.

Now, let us analyse these two incidents. What conclusion must be come to? We must not blame the architect; he is only interested in architecture. He wishes to design something beautiful to behold, that is why he plans the house to suit his client's whim, and then asks, "Where would you like the bathroom?" or "What kind of sanitary and heating appliances do you desire?"

These questions are peculiarly within the province of the sanitary and heating engineer, and just as soon as a permit is granted the latter should make it his business to interview the person intending to build. These matters should be settled first of all—that is, provisions should be made for such fixtures as will be in keeping with the proposed building. In this way, the owner becomes interested, first of all, in the most important matters relating to his building, and will be on the lookout to see that they are not neglected.

The two incidents related are actual facts, and have been decided as related. The $12,000 house will contain a warm air furnace; the $8,500 house will be fitted up by those plumbing and heating goods that are more in keeping with such a home.

Both prove without doubt that sanitary and heating engineers need to become better salesmen, and should study salesmanship and become merchants; should have places where a stock can be put on display, where a model bathroom or kitchen can be shown. When such a course is taken by members of our craft, just so soon will their services be appreciated, better plumbing be installed, and greater profits procured for those engaged in the trade.

RELY ON YOURSELF

In battle or business, whatever the game. In law or in love, it is ever the same. In the struggle for power, or scramble for pelf. Let this be your motto, "Rely on Yourself." For whether the prize be a ribbon or stone. The victor is he who can go it alone.

—Saxe.

THE SANITARY ENGINEER

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APRIL 16, 1917

A POSSIBLE DANGER.

FROM all parts of Canada there are rumors of greater activity in the building trade, much more so in small towns. Factories are establishing plants in small towns, thus requiring that homes be built for the workers.

While we are pleased to note this state of affairs, we see to some extent a possible danger of there being a lot of cheaply gotten-up homes. Material, as we all know, is much more expensive than ever before in the history of the world. Plumbing and heating goods are no exception to the rule of the day, and as in days gone by so it will be again, that the plumbing and heating of a home will be the last matter to be considered, instead of the first. Estimates will be, and are being, pared down to the "quick," which means that the sanitary and heating trade will be asked to "figure close" in an endeavor to instal plumbing and heating that will meet price.

Further, all such work will in a very short time require to be repaired and sanitary and heating engineers will get the ill-will of the occupants of homes thus equipped with cheap meet-the-price installations.

In the first place we would strongly urge that when a member of the trade is asked to tender on a job that he recognize no one but the owner, and if the owner be a speculative builder then that he refuse to instal goods that are not high grade, and that he employ only first-class mechanics.

The public will live to see that the stand taken in their behalf was in the right direction, that repair bills will be something unknown to them. This will be as it should be, and the trade will not only have taken the right stand, but the low cost of upkeep will be self-evident and appreciated by the householder as well as owner.

SHOULD ADVERTISE

IN A certain Canadian city there resides a sanitary and heating engineer who actually believes in advertising.

He is not by himself by any means, except that he not only believes in advertising, but he puts into practice his belief.

This sanitary and heating engineer never goes to an architect's office for a job. Never gives an estimate and never fails to meets his accounts when they are due. He declares that advertising in the sanitary and heating business not only brings him lots of business, but it assists him to collect his accounts. He is a merchant, but was not always one, and declares that his store is his best asset, his customers call upon him for small supplies, bathroom fittings, towel rails, toilet paper fixtures and the like, and the sale of same more than pays the overhead attached to that branch.

Customers call in to pay their accounts and ask his advice upon various matters. By having them call he is very often able to start a conversation about modern fixtures, etc., and has secured many a nice job as a result.

One other matter which he finds of great benefit is the enclosing of a small folder describing, say, a gas water heater, a heat-controlling device, furnace cleaning tools, or asbestos boiler covering. Just the other day a customer came into his store paid an account and brought a folder with him describing a gas water heater, and bought one of the latter.

In spite of the fact that most jokes and jibes now published in the newspapers are generally taken in earnest by many, the newspapers in the town will not cast reflections upon the town plumbers. Why? Because they find that it does not pay. Newspaper men are only human, and certainly will not use their space to abuse or annoy an advertiser. It is simply a case of "You scratch my back and I'll scratch yours" with newspaper publishers. But apart from all that, it pays to advertise, and of all tradesmen in the world who neglect to advertise it is the plumbing trade as a whole.

CIVIC MISMANAGEMENT.

THE Toronto city fathers have had a very busy time, wasting time, this last week or two. They have been trying to create in the minds of the people of Toronto the idea that to postpone necessary payments will be a saving of money. They have asked the heads of departments to "cut down their estimates." No department was left alone, and even the Technical School, that splendid institution that even at this early date is proving such a power for good, is being crippled by the short-sighted council of the City of Toronto. At least three big items of expenditure which are responsible for a lot of the debit under which Toronto's citizens are groaning, could have been saved, if a practical Commissioner of Works had been at the head of affairs, a man with some real back-bone. But, no, millions of dollars have been wasted, and millions more are following, both in capital expenditure and upkeep. Sanitary and heating engineers are interested in these three big wastes.

First, there is a water works department with pumping plant big enough to supply plenty of water for a population

of at least a million people. In this plant are to be found leaking mains, leaking taps, and leaking ball cocks.

Second, to cope with this waste an additional filtration plant is provided, costing several million dollars capital expense and additional upkeep.

Third, the sewage disposal plant at Morley Avenue could have been made far more efficient had it not been flooded with too much water, which interfered with the working or proper cultivation of bacteria, all because of an extravagant waste of water, that could have been eliminated years ago if a practical man of foresight had been at the head of our public works.

There is need for true economy being put into operation in Toronto and every sanitary engineer should rise up and denounce such waste. If the advice of THE SANITARY ENGINEER had been followed four years ago, Toronto's water services would all have been metered. No additional filtration plant would have been required. No additional water works plant wanted, and a sanitary sewage disposal plant would have been in operation. Let every little town beware of such needless waste, which brings woful want in its train.

SANITATION AN INCIDENTAL.

ACCORDING to Dr. Hastings, the M.O.H. for Toronto, sanitary plumbing and all manner of engineering that prevents disease, pollution and uncleanliness, are merely incidentals, and of no importance in comparison with medical affairs. Dr. Hastings has done much good in Toronto, but, strange as it may seem, he risks destroying with his left hand all the good he has done with his right.

The city fathers have been trying to reduce the tax rate for 1917 by neglecting all manner of things, side-stepping all kinds of necessities, etc., and one of the departments to come under the eye of the city fathers was the health department. They asked Dr. Hastings to reduce his estimates, and he did, by dismissing all the plumbing inspectors and practically putting the plumbing department out of existence.

When asked by one of the Controllers if he thought sanitary engineers were an important necessity Dr. Hastings replied that he did not think sanitary engineering had anything to do with the health of the people.

But what about his own calling? When Dr. Hastings' own champions, the best medical men in the land, take a house to live in, they call upon the best sanitary engineer in the district, and even go so far as to import a good man to smoke test, examine and otherwise inspect the plumbing before they occupy the house.

The writer lived in Glasgow at the time when that city was visited with the big smallpox plague, people were taken out of houses all round his home, he and his family of little children were kept clean, surroundings were kept clean and sanitary plumbing was in splendid order and not one of the family were even indisposed.

Provost Chisholm at that time got the students from the medical colleges to visit everyone in an endeavor to induce them to be vaccinated. The writer refused, so did his family, and proved to those visiting students that if the medical faculty would confine their thoughts to preventive measures other than inoculating rotten filth into humanity, we would soon have a big robust race. It will take many generations for humanity to clean itself of the rotten calf-lymph it has been charged with. The theory of vaccination is on a par with the one almost every mother had about measles, "put them all together; they have to have it anyway." Pure rot.

Let sanitary engineers put into practice in every possible way what they know, and inside of 25 years the medical men will be looked upon as a freak of the past, and classed with the old Indian medicine man of by-gone days.

Dr. Hastings can see these times coming, so can every thinking man, but like the poor deluded drain diggers who have no more ambition than digging drains and laying tile pipe for a living, the medical man is afraid of his job.

Dr. Hastings can be shown and if the daily press was not muzzled, he would be, that sanitary engineers promote cleanliness in every form and cleanliness is next to godliness. To become more God-like should be the aim of every human being.

COST OF DOING BUSINESS.

"I HAVE been particularly interested in the articles recently published in THE SANITARY ENGINEER and the arguments as well as the splendid information are bound to be invaluable to every person who reads them. But there are still two matters at least that you have not touched upon, and which in my business have resulted in reducing my overhead expenses. One is that I have been able to reduce the amount of cost going back to jobs by buying high grade goods. I find that not only do I save time, but my men take a greater pride in their work, and once it is done, it is well done. This to my mind is a great factor in reducing one's overhead expenses.

"Another matter which to my mind is responsible for a lot of unnecessary overhead expenditure is that of not taking every one of your men into your confidence. Let me relate to you how I have succeeded in saving 2½ per cent. on material. That is, I have found less pipe ends left over, fewer cracked fittings, and generally less waste in the shop.

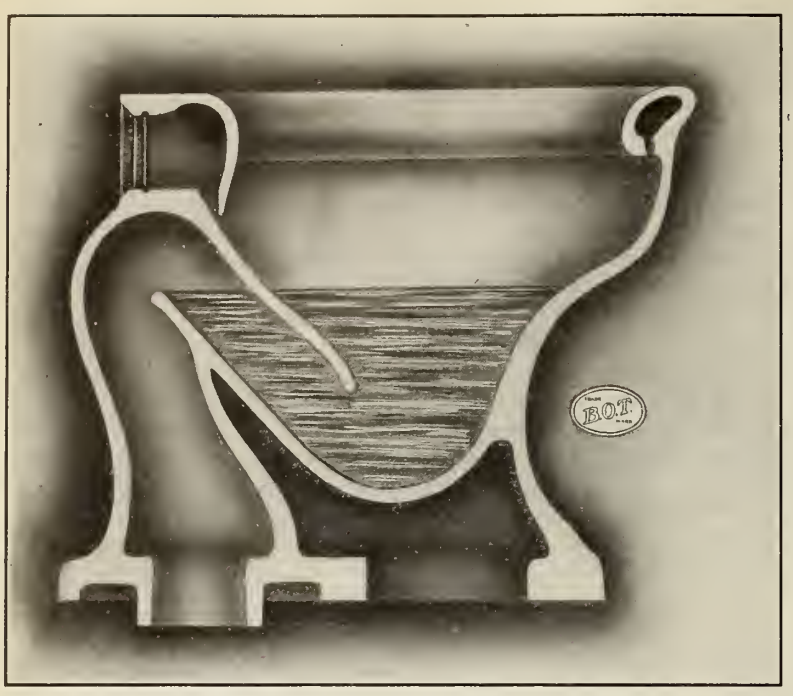
"I took my men to one side, about three years ago, and asked if any of them were saving any money. This may seem a little impertinent, but as I was used to talking to the fellows they did not take exception to my asking. To-day I find that every man employed by me has a 'nice bank account.' You may ask, Mr. Editor, what that has to do with cutting down overhead expenses. Just this, I believe that a man who values money, also values material, and will not waste it, and I know from actual experience that such is the case with my men."

The above was part of a conversation between the writer and one who had had the experience stated. No doubt such co-operation between the boss and his men cannot fail to be a success. If such feelings prevailed, as a rule rather than as the exception, there would be fewer men starting on their own and competing with "the boss" than is the case at the present day.

FIRST, always seek to excel yourself. Put yourself in competition with yourself each day. Each morning look back upon your work of yesterday and then try to beat it.

Second, I ask you to look upon the whole of life as a vast university—the ideal university of the future whose students will spend a part of the time in learning what to do and how to do it and then a larger part in actually doing the things they have learned how to do.

—Sheldon.



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TORONTO BRANCH, 159 WEST RICHMOND STREET

Straight Talks to the Craft

Being the First Article Dealing With the Proceedings of the Last Four National Conventions, Provincial as Well as Local Convention Proceedings Will Also be Commented Upon.

By One of Us.

IN THE April 2, issue of THE SANITARY ENGINEER, an article appeared on page 18 entitled, "What's the matter with the Trade Association." Those who took the trouble to read the article will be more than interested in this and other articles to follow.

When Joseph Thibeault, president of the master plumbers' association of Montreal, opened the eighteenth annual convention he touched upon a number of very vital matters, which alone would have kept every member of the craft busy for many a long day.

The writer will never forget the inspiration received from the words spoken by that splendid French-Canadian. For the benefit of our readers we will reprint a few of the most important parts of his address, and we sincerely hope that the re-reading of these words will sink down deep into the heart of every reader of THE SANITARY ENGINEER.

In opening the convention he said:

"Delegates and Master Plumbers of the local association of the City of Montreal, I think it is the desire of the citizens to wish you all a welcome to this city. I regret greatly that I cannot speak your beautiful language fluently enough to express myself for the citizens of Montreal; and especially the master plumbers and the wholesale people are pleased to see you amongst us for a few days. I think the master plumbers of the city will do all that is in their power to make your trip to this city as pleasing as possible and if the master plumbers of the city of Montreal cannot do it I am sure that the wholesale houses are here to have an eye on them and see that they do their duty and make it pleasant for you.

"It is all well and good to have amusements and to have a good time, but there is something else, gentlemen, that you have got to look into.

In the first place I think you are here to look over very important questions and that you are here for your own interests as well as those of others, and you must see fair play for all.

"At the same time you have got to take into consideration that you are representing the most important trade among all the trades in building construction.

"I am sure that all the plumbers of Montreal as well as the engineers and architects expect from the master plumbers of this great Dominion that we will do what is right, and that they will take what belongs to them and give to others what belongs to others.

"You gentlemen, have to see to it that in your resolutions the law is abided by and that all plumbers be qualified plumbers. In the plumbing line as in other lines, you must be careful of the men you employ under you. We have here in our city—and I think it is the same in other cities—to pass a certain examination, to pay licenses to occupy shops and to submit our plans and work to the city authorities.

EDITOR'S NOTE.—These articles are being specially prepared from proceedings of past conventions, with a view of showing how and why associations do not appear to be prospering as they should. Interest in the affairs of all associations, not only in the sanitary and heating trade, but in every trade appears to lack the punch that should be more in evidence. There are trade problems, both of a business, as well as of a technical nature that should be discussed and dealt with, but which are not.

No one can honestly say that business conditions have been improved between the manufacturer, jobber and the trade during the last 20 years. In fact things are much worse. Why is there not a better feeling between every department of the business? Simply because both factions no doubt have wrongs to right, matters that require earnest thought. THE SANITARY ENGINEER *is assuming the responsibility of having a frank, fearless talk, and if it can only start "a tiny ball rolling" that will result in bettering conditions, it will feel it has at least done some good. The interchange of ideas never did any good unless those interested acted upon some of the ideas, and many important matters have been taken up and discussed at the various conventions and ended there. This condition is not going to drag on any longer if* THE SANITARY ENGINEER *can prevent it, and we want to hear from any who care to help along the work. We might say that we shall frankly conclude that those who are not interested in the stand we have taken, are not fit persons to be in the business.*

Man is not an isolated animal, and cannot make a success of his business unless he either co-operates with his fellow craftsmen, or else preys upon his fellowmen. The preying element has hitherto predominated and is doing so yet, but it must be rooted out, lock, stock and barrel, whether he be manufacturer supplyman or tradesman. The only thing THE SANITARY ENGINEER *wants is frank opinions and a little forbearance. Given these we have no fear of the outcome.*

"Of course I cannot speak for other cities. I know there are great and enterprising cities in the West as well as in the East and I don't think we have much to show them here, but as we are gathering together every few years to see if we can improve our positions and to see what we can learn, from one another.

"The next thing you have got to do is to recognize the wholesale concerns, which are great protectors to our trade. And the jobbers as well.

"Sometimes these people make mistakes. It is only common sense that they, the wholesale firms, expect to get returns for whatever they sell to master plumbers, but they have to give them protection. It is like any other trade. If you want to buy a suit of clothes there is a price for the retailer and a price for the individual, it is just the same in our business. We must see that there is one price for the master plumbers and one for the public.

"This is a thing I would not like to discuss, however. This is a free country and these things must adjust themselves. Our wholesale firms are as a rule very wealthy and quite independent and I do not think it is any use for us to find fault with the way they are doing business.

"The only thing we can do is to get together. Go over the country and politely express our reasons and I have no doubt but that we will get over any difficulty in this respect. In Montreal at the present time there is little trouble in this regard and I think it is only a question of time until the whole question is satisfactorily settled.

"The wholesaler and the jobber are not the only two classes that have to be watched in this respect, but an eye has got to be kept on the manufacturer as well, and I hope that you will get together on these things while you are here.

"It is all very well to look for protection and money in trying to build up your business and make it as large as possible, but there is another thing which is very important; it is the sanitary point.

"See that you get a good class of master plumbers, see that the rules and regulation of your cities are complied with, and by doing these things you have no idea the amount of good you can do your business.

"In the city of Montreal some years ago I may say that fifty or sixty per cent. of the houses were not fit for human habitation according to the present sanitary laws, but I must tell you that things are greatly changed now.

"I have been quite a few years in the business and I have quite a bit of

knowledge about it, and I am going to tell you something in a very few words.

"A very few years ago I could count the number of baths in the city of Montreal, now I could not count the number of apartments in the city.

"I thank the master plumbers for the improvement in these things. I think the Montreal Master Plumbers' Association is the mother association of the whole Dominion of Canada. I think we are the oldest association and have worked from east to west to try and improve conditions in the different cities of the Dominion. We are not working solely for protection nor are we trying to get the largest possible returns, but we are seeing simply what can be done to improve present conditions.

"I will conclude my remarks now with an instance which I shall never forget.

"About twenty years ago we invited a distinguished doctor (Dr. Smith) to address us on sanitary points, and he said at that time that the plumbers contribute more to the health of the city than any other body, and you are the equivalent of the good doctor. For my part I am a specialist, and any place where I go I always make this inquiry first.

" 'Who is your plumber?'

"Gentlemen, I am only quoting the very words of this doctor who is still living, and he declared that the first thing he did when he entered a house was to ask the master of the house who his plumber was, and then I rung this plumber up and told him how the work was done and he could judge what the sanitary condition was.

"Some years ago we used to refer to 'The plumber around the corner,' 'The robber around the corner.' Now our trade is considered just as honest as any other trade, and all that remains now is the old habit of fighting every time a customer receives a bill.

"It must be remembered that when you are called up in a great hurry and when you tear up the floor and make necessary repairs there or in the walls, that your work is hidden away, and the master of the house can never realize what has been done, therefore he always finds fault with the size of his bill.

"On the other hand when a man goes to a tailor and buys a suit of clothes. He puts it on, it fits him well and he is satisfied, and with the shoe maker it is the same thing, but I never found a man that when his closet was broken and after having it repaired that he was satisfied as a result, and as a rule declares that he wished he had never seen the old closet."

Now, what points of importance that were referred to by Mr. Thibeault have been settled, or even improved?

Not one. How do matters stand to-day between the trade and their sources of supply? There is no depth of meaning in the term "the trade," that is speaking generally. Things are very much the same as they were years ago. And why? Simply because in the first place the gospel of "every man for himself and the devil take the hindmost" seems to prevail. To-day almost every manufacturer is also a jobber, and manufacturers in other lines can get material in many cases as cheap as a jobber. We are not insinuating because we know it is true and can prove it. But who is to blame? Not the manufacturer, not the jobber, not the trade. It is simply a case of the times in which we live being in a state of chaos. Men are in business to "make money," irrespective of the rights of others, and until men begin to feel that each and every man has individual rights, and until each and every man will first respect his brother's rights no such thing as commercial and business peace can be possible.

Now, how can such a peace be procured? First by every man making up his mind that he will not endeavor to become rich in this world's goods unless such riches have been procured by giving service and quality.

Secondly, by every man's yea being yea and his nay, nay.

Third, by every member of the trade becoming banded together with one grand association to a manufacturers' association, and a jobbers' association.

We will suppose for a moment that there exist these three big associations. They appoint officers. These officers meet. What for? To watch the interests of each other? No, that has been the whole trouble. Each would appear to have interests that were antagonistic to the other. These men should meet to see how each party can best serve the other. And arriving at a solution, means that commercial peace will soon prevail between all concerned.

There are no such things as "rights" if some one suffers in any way. No one should want to profit by the loss or at the expense of another, and no association as we said before, should exist to "protect their rights," but rather to guard against any evil creeping in that would work to the detriment of any party concerned.

Mr. Thibeault spoke in very convincing words of the importance of the progress made in Montreal during the past 20 years, which dated back to two years before the forming of the Canadian Society. He next referred to the difference between a tailor and a plumber and said that the work of the latter is very often covered up and once installed appears to be very simple, that experience proves that very seldom do we find a person satisfied with the service rendered by a plumber. This is simply a matter of education. How are we to educate the public? By advertising, by supporting the local papers, and by putting our side of the case before the public.

Just to illustrate this question we will relate a conversation that took place a few weeks ago in the town of S———.

There is no plumbing by-law in force there and a number of the sanitary engineers desire to have one put into operation. This town has a population of 12,000, and is nothing but a dump hole for the cheapest grade of goods that can be procured.

Well, the writer called upon the editor of the local daily paper and asked if he would support a movement to have a plumbing by-law put into force. After explaining the benefits which the public would get, the better grade of work, etc., which would result this editor replied something after this manner:—

"Well, Mr. Sanitary Engineer, I firmly believe all you say and my sympathies go out to both the plumbing trade and the public. I believe there should be a plumbing by-law in force in our town. BUT where do I get off at? Do you know that if I was to look up my books I could prove that a church mouse could not exist on the revenue I have procured from the plumbing trade in 10 years."

And there is the whole question. The sanitary and heating engineers will have to use more printers' ink if they want to be recognized, or have their views expressed through the press. Newspapermen are only human, and cannot live unless their papers are supported.

Furthermore, if sanitary and heating engineers want public recognition and sympathy, they will require to do as other businessmen do—advertise, become specialists in the eyes of the public, and not mere creatures in the background until called for.

The remainder of the eighteenth convention will be commented upon in our next issue. In the meantime, we want to hear from members of the trade who want to see it lifted out of the present rut, so that by the time the next annual convention comes along, there will be "something attempted, something done."

(Continued in next issue.)

THE ARTFUL PLUMBER AGAIN!

I have always believed in the honest plumber. Plumbers are a much-maligned class, and there is really no reason why most of them should not be honest and responsible persons, in spite of their detractors. It is one of the ideals of my existence, a bright hope that lights me on my way through this vale of tears, that some day I shall meet an honest plumber and shake him by the hand. My ideal is not dashed even by this latest calumny that has been put about by the aforesaid detractors:

The supposed fine example of old-time wood-carver's art in the decorative work of the Chapter House door in Rochester Cathedral has been found to be a casting in solid lead cleverly inserted in the panels.

Even the envious detractors are fain to admit the cleverness of the craftsman in lead, which is further proved by the fact that the casting was equal to a fine example of the old-time wood-carver's art.

Craft Should Encourage Use of Gas

No Better Field Can Be Conceived Than the Sale of Gas Appliances of All Kinds, Domestic as Well as Industrial—Artificial Gas is Becoming More and More a By-Product, and to Encourage Its Use is Really a Work of Conservation

THE year 1917 is unfolding some wonderful inventions in the gas business; not only in the manufacture, but in the appliances by which gas can be used as fuel.

Not only is gas being used when one appliance or another is used, but also the free air, the air which is a free, God-given commodity, that cannot be profitably exploited except by the individual. To burn gas, air must be used in some way or other; gas will not burn in any other way, and air in practice is a part of the fuel being burned. Let us recall for a moment or two what appliances sanitary and heating engineers can instal in which gas is used as fuel.

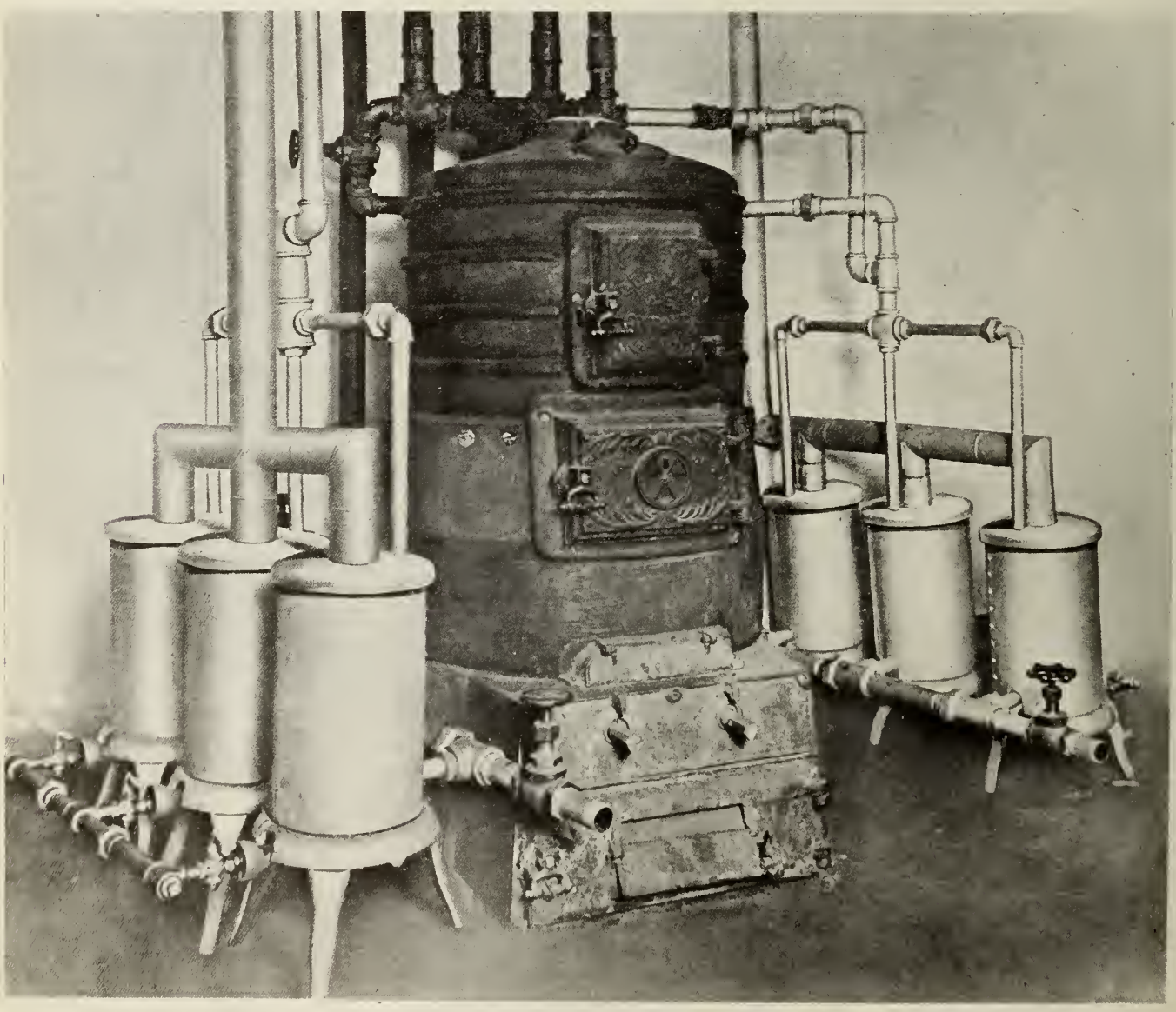
The most popular is, of course, the gas stove; then comes the gas water heater, instantaneous and otherwise There are also gas furnaces for heating houses that are proving to be just as economical as coal furnaces. Some are specially built, while others consist simply of special gas burners attached to an ordinary coal furnace.

There are also gas water heaters that can be used along with the already installed furnace. Not only one, but many.

The illustration on this page is a picture of an auxiliary heater connected to the hot water heating system in the home of the inventor, Mr. Harold Jarvis, of the Jarvis Heater Co., Toronto. This system has been tried out by Mr. Jarvis for four years and to-day is in as perfect order as when it was installed. During these years it has given perfect satisfaction.

It consists of a battery of six of Mr. Jarvis' gas water heaters, governed by an Air Temperature Thermostat. By means of this device the gas is only burnt during the time the room temperature is below the desired degree. A small pilot light, of course, is left burning, but the gas shuts off automatically the moment the desired temperature has been reached and will not light up again until the room has cooled down. For spring and fall heating this is an ideal system, as it gives the desired heat with no shovelling of coal or cleaning out ashes. There is nothing to get out of order. There are no electric fans or batteries, nor anything needing renewal about the system. The automatic control is worked by a powerful permanent magnet.

Mr. Jarvis claims for his heater that



Hot water heating combination using the regular furnace or gas water heaters.

it is cheaper than coal in its operation. This is only one of Mr. Jarvis' inventions.

The Jarvis Heater Co., 475 Yonge street, Toronto, will be pleased to furnish full particulars about either of the two devices mentioned above upon request.

There are quite a number of houses being heated entirely by gas in Canada, and why should this not be so? As we stated before, artificial or manufactured gas is becoming more and more a by-product, because of the fact that other chemicals and products, or as they were once termed, "residues," are now becoming more valuable and indispensable every day. Coal will have to be converted into something to produce these "one time wastes," and gas will become in this way a by-product.

Now, why should sanitary and heating engineers not do all in their power to encourage the use of gas; it is not a local matter, it is an international, universal problem, one which should be solved by every one in any way possible.

We referred to the gas heater furnace, which is a problem for the heating engineer, from a heating standpoint The heating engineer can with very little extra cost, in comparison with the service rendered, instal gas furnaces, or burners in connection with existing furnaces that can be operated automatically. A temperature controlling device can be fitted to such a furnace, and an even temperature maintained the winter through. This is a sanitary measure, too, because by the use of gas a certain vacuum is created in a house which induces a greater influx of fresh air from the outside through every nook and cranny that may foolishly have been closed up, etc. Dust is kept down to a minimum, which eases the work of the housewife.

An abundant and instant supply of hot water for domestic purposes is in these days an absolute necessity, and the sanitary engineer can install these appliances as no other person can, that is, of course, if he is a practical man. One of the worst features about this business is that too many impractical men are at present installing gas appliances and in such an impractical way that those who use gas are being penalized by paying big gas bills. The writer has many a time re-installed and regulated a gas water heater and cut down cost of gas by as much as twenty to thirty-five per cent., and the practical man can demonstrate this fact when competing with concerns that employ boys and men who have not had the necessary experience through long years of practice. It can be argued that a parrot can be taught to talk but it does not know what it says. The same with many men who are allowed, even by gas companies to instal gas water heating appliances; these boys do not actually know and never will realize what they are doing when they instal gas heating appliances. Therefore, it can be plainly seen that sanitary and heating engineers have a big field in which to labor.

The writer had the pleasure recently of investigating a few of the latest appliances. One there was, very simple, too, that could be operated from as many rooms as desired, furnish a gallon, five gallons, or a steady stream of hot water, and could not possibly be left burning inadvertently.

How is this operated one may ask? Simply by turning, or pulling a lever to a certain point indicated in minutes or gallons, if the gas burner is required to be burning, say, 3 minutes for one gallon, it would automatically shut the gas off in 3 minutes, or if 30 gallons of hot water be required, then the lever could be placed at such a point as would close the gas off at the pre-determined time.

The cost of these appliances, too, is very moderate, much less than might be expected, though we should not discuss first cost these days, but rather durability, service and cost of upkeep and operation.

Another reason why sanitary and heating engineers should push the sale of gas appliances may be illustrated in connection with an actual experience.

About two years ago a certain concern was somewhat impressed with a series of articles that appeared in the SANITARY ENGINEER. A stock of gas water heaters was bought and featured for several months. A large number were sold and installed by them, which brought a fair return at the time; last year the same plan was carried out and again a good profit was secured, and this, remember, in a city where the gas company appear to cut the heart out of the profits of the sanitary engineer, as well as selling the goods "on time." But in spite of this, our sanitary engineer friend "put it all over" the gas company in service, actually took out gas water heaters installed by the gas company, re-installed the same heater and cut down gas consumption nearly 30 per cent. That is real practical service.

Furthermore, the service given by this sanitary engineer has earned a lasting recognition which has built up a splendid business for the firm in other lines.

It should never be forgotten that the more appliances of a domestic service type that can be introduced into a home, office, or factory by the sanitary and heating engineer, so much the more do their calling and services become more indispensable to the every-day life of humanity; and the sale, installing, introducing, and studying of all domestic appliances is bound to prove profitable to all concerned—the manufacturer, the jobber, the sanitary and heating engineer, and the public.

The public is in that way reaping the benefit of all those appliances referred to and will appreciate such results by continued patronage.

HOW LEAD PRODUCTS ARE MADE

(Continued from page 45.)

ever before, and one that requires expert chemists, as well as modern plant. A view of one of the melting pots is shown, along with the arrangement of the ingot moulds. Various types of moulds are used, some for babbitt metal, some for type metal used in the printing trade, as well as the regular ingot moulds for pig lead. In fact, as stated elsewhere, the Canadian metal industry can easily take care of any business, particularly those plants that specialize in non-ferrous metals, that may come their way for many years to come. Industries such as these are the true wealth of Canada.

CLAY TILE PIPE VS. CAST IRON SOIL PIPE

(Continued from page 28.)

strong as they should be and like the Roman Aqueducts are out of date and inefficient.

2.—Yes, because caulked with lead they are not easily broken anywhere, will stand all pressure required and are efficient.

3.—No clay tile pipe nearer a building than 5 feet from sewer conveyance. Tile pipe only allowed for surface drainage.—E.N.B.

To the above testimonies in favor of cast iron soil pipe we could add replies from Prince Edward Island, Fredericton, N. B., St John, N. B., Fort William Oakville, Brantford, Chatham, Stratford, Windsor, Burlington and Galt.

From the Western provinces we have received a large number of replies and will refer to them in next issue. The towns and cities are Winnipeg, St Boniface, Regina, Edmonton, Calgary, and from the province of Quebec, we have replies from Montreal and Westmount.

We propose keeping this question alive until every town or city in Canada is furnished with indisputable proof, that clay tile pipe is absolutely unfit to be installed under dwellings or buildings, except under certain conditions. We will show in concrete form why it is not and will also refer to exceptional conditions in which it's use is justified.

(Continued in next issue.)

Brazing Solder.—Brazing solder for brass consists usually of copper 50 per cent. and zinc 50 per cent. The alloy is made by melting the copper under charcoal and then adding the zinc, says the Ironmonger. It has to be granulated before it can be used, and this can be done in three ways. One plan is to pour the metal in a thin stream from an elevation into a tank of water. A second is to allow the metal to cool, and then just before it solidifies vigorously to stir it until it gets hard. This breaks it into grains, which are sieved, and the coarse particles remelted. Before using, the granulated solder must be cleaned in an acid dip. The mechanical means is to pour the alloy into ingots, then reheat and crush with a hammer.

Farmers in Want of City Conveniences

The Cost is Not Exhorbitant—While the First Cost Appears High, It is Really Less Than in a City—The Best is the Cheapest and Cuts Out Unnecessary Repairs.

BY ONE OF US.

IF ALL we read, and all we hear about plumbers, their charges and how to evade those charges were to be acted upon, and the whole trade told to "Avaunt"—get out of business, disappear—many of our newspaper editors, penny-a-liners, and even professors of physics, would likewise have to seek other fields to fill in their time. A few months ago a very large publishing concern practically endorsed the step that plumbers could be dispensed with, that a handy man and a wrench could install all appliances necessary to make a farm or rural home up to date and sanitary.

Some time ago a professor of sanitary science took upon himself to design an installation which, had he given a little more thought to the work which such installations are called upon to do, he would not have designed as he did.

These men appear to think that the farmer should do all the work himself and "do the rascally plumber out of a job."

If on the other hand the farmer were shown how to be a more efficient farmer, grow two to one of every thing he is at present growing then these "sources-of-knowledge" professors and the like would be doing a splendid work.

There is however only one course for the sanitary and heating engineer to do and that is, get right down to "hard pan" show these "know-all" professors where they are wrong and reason these questions of construction and design out with the farmers themselves.

Such a step would be not only lucrative, but educational too, and if one thing is needed more than another it is education, and of course a knowledge of the application of such education.

The following is a clipping from October issue of "Conservation."

Greater Home Comforts.

A Water Service Yields Large Returns in Conservation of Women's Health and Strength.

"Only two and one-half per cent. of the 400 farmers visited in connection with the Agricultural Survey of the Commission of Conservation in 1915 had the complete service of water on tap, bath and toilet in their houses. Five per cent. had automobiles; 38 per cent. had pianos, 32 per cent. had organs, and 22 per cent. had gasoline engines on the farm. While it is well that 70 per cent. possess sufficient musical interest to have either a piano or organ in the house, it is regrettable indeed that 39 out of 40 have not installed the water service and bath.

"No investment yields more in conserving the women's health and strength, in creating greater home comforts, and in elevating the general tone of the material side of living than the installation of water service and the sanitary conveniences in the home. Thousands of farmers who could well afford to do so have not put in the service for various reasons—because they have not thought of it, or because they do not know how to go about it, or because they think it too expensive. The cost is not so great as many imagine. A bath tub can be purchased for $10, a sink basin for $3, a closet for $16, a 30-gallon hot water tank for $10. Various means are employed in obtaining pressure at the taps, such as a force pump to elevate water to a tank in the attic or the pneumatic tank in the cellar, and the cost of piping and installation will vary according to circumstances.

"One farmer had the hot water attachment, tank, bath and dry closet installed for $50, the farmer himself helping the plumber to do the work. The complete service, which would be used 365 days in the year, can be installed on the average farm for less than the farmer pays for the binder he uses for a few days at harvest time and which stands idle for the balance of the year. The man on the farm thinks he cannot get along without the many labor-saving devices. How about a labor-saver for the farm women? It is unquestionably a common-sense business proposition to have the water service and bath in the house as a comfort to every member of the family and a constant labor-saving convenience for those who do the daily recurring work of the household, the farm women.

Any good effect this article might have upon the farmer who contemplated installing a sanitary system in his home is likely to be far outweighed by the erroneous ideas and impressions it will give the prospective purchaser on the question of cost. To install such shoddy goods as could be obtained at the prices mentioned would be to court disaster and would in all probability result in the victim of such experiment abandoning his venture in this respect and reverting to his old-time ways.

Any reader would assume from this that a house of plumbing such as described in the accompanying illustrations could be purchased for $60 or $70 at the most. If "a bath tub can be purchased for $10," whatever kind of a bath tub would it be? Some of our readers would be interested to know something about $10 bath tubs. Even the cheapest sheet steel tubs cost more than $10 unless such as can be procured from a mail order house. But one thing is certain, no respectable sanitary engineer would install such at any price. Most farmers cannot afford to have short-lived goods installed. And a sink for $3.00! Well we know of certain lines of sinks that can be had for that sum, but they are in the tinware line, no lasting quality in them. No housewife can afford to have a $3.00 sink in her home, least of all a farmer's wife. A $16.00 closet next is advised. Well that, too, MAY be procured, plus short life, frequent repairs and hours of needless water pumping. There isn't a $16.00 w. c. made that is a "good buy" for a farmer. He will have a constant job pumping water to take care of the leaking interior mechanism of such a w.c. tank. So why advise such trash?

The Best Cost Less Than in City Homes

Now to show what really can be procured and the approximate cost.

In the first place it is assumed that there is a good water supply, that is a good well, at no great distance from the house.

And let us assume that the house is fairly well heated so that the piping will be protected from frost. Let us also assume that the farmer wishes to keep his drinking water free from pollution and that he wants all the conveniences to be had the same as in the average city home.

First he wants a kitchen sink, bath tub, lavatory, w. c., and we will include a pair of laundry tubs which can easily be installed in the average farm house kitchen.

Then water pressure is required so as to be able to water the lawn and put out a small fire if such should occur.

Next he wants electricity and we assume that he has no current or power of any kind available in the house. Then his wife would like a gas range just as her city sisters have, same make in every detail, and of course lots of hot water. We will assume for the sake of argument that there are 8 of a family in the household. Such a house in the city would be worth approximately $5000 in normal times.

Now in the city of Toronto every man, woman and child pays, to live in the city, approximately $33.00 per person in taxes. The property has to be mortgaged by the city in some way or another to raise money to effect city improvements, street lighting, water rates and general civic management. Suppose the farmer with 8 of a family were asked to pay in the neighborhood of $264 per year taxes, it would mean that there is a mortgage, or interest to pay on property which he owns, but upon which the city government has put a tax of $264, and what would he get more than we have named?

Now $264 would pay six per cent. on an investment of $4400. Let us see how much of an investment would be involved in purchasing the sanitary

appliances named above, all to be installed in the best possible way—the best serviceable goods installed by a practical man, and installed with a view of minimizing the cost of upkeep, depreciation, etc.

A modern bath room, kitchen, hot and cold water and double laundry tubs, with septic tank of proper size would cost about $350.

An electric generating unit with storage batteries and electric wiring and suitable lighting fixtures can be procured for $475 in round figures.

A pneumatic water system large enough to furnish water for a family of about 8 persons driven by an electric motor all complete can be procured for $200. A gas making machine which will make gas suitable for use with a regular gas range can be had for another $200 or so. And let us go one further; there can be a hot water or steam furnace installed for say $650 for an 8 roomed house. This latter could be reduced to $150 to $175 if a warm air furnace is installed. But we are allowing for the very best. How much does this come to?

Bathroom and kitchen outfit, septic tank, hot and cold water at tap and laundry tubs	$350.00
Gas making outfit	$200.00
Electric power unit	$475.00
Pneumatic water system	$200.00
Hot water or steam heating	$650.00
Total	$1875.00

At 6 per cent. the cost per annum is $112.00 and no mortgaged property to the extent of $4,400. These are arguments in favor of our readers. They are facts that can be put before the farmer, the most desirable customer for the trade for many years to come. Such facts as these placed before him will give him a better idea of what a serviceable installation will cost than will the unreliable figures quoted by all kinds of professors, not possessors, of practical sanitary science.

(Continued in next issue)

Selling Quality Plumbing Goods

The Trade Should Endeavor to Push High-Priced Lines Instead of Closing Sales on Price Concessions—A Sales Talk With Good Points.

THE importance of backing up good advertising with good salesmanship, in the placing before the public of high priced ware, cannot be overestimated. The acknowledged failure of so many sanitary engineers to sell high priced ware, even after extensive advertising, is found in the fact that the majority are not crack salesmen, and therefore the advertising is not backed up by them with good sales talk.

The average sanitary engineer in selling his wares, thinks about nothing but cost, size, profit and roughing measurements, and herein lies the cause of his failure to sell high priced ware, even after good advertising. High priced ware commands a higher price because, like any other commodity, it is worth it, but as yet the sanitary engineer does not appear to know how to present either side of the case.

Without a knowledge of good salesmanship, he unharnesses the proposition of selling high priced ware by offering the dubious customer something at a lesser figure in order to clinch the sale; or it may be that he can more easily procure the cheaper article from his regular supply house. In addition, the average house-owner, not being able to see the difference, is easily switched by a little talk of money saving, unless there is someone who sells and boosts the high priced line.

In order to inspire more confidence among their customers and manufacturers, and also to give the high priced ware its proper place, sanitary engineers should handle their interviews with prospective customers themselves, and instead of trying to meet them with an affirmative answer at every turn, should go after them like an aggressive salesman, and point out the advantages and disadvantages of the low and the high priced ware. If this plan were adopted, and the customer allowed to choose for himself, higher priced goods would come into their own and eventually set the standard of the market.

For the benefit of the trade, who take kindly to the suggestion, the following extract from an interview between a sanitary engineer and a prospective customer, who eventually bought the best goods obtainable, may prove valuable.

"Well Mr. S. the expensive stuff does cost more than these other lines but remember that regardless of what you buy, you can only get what you pay for, and sometimes not even that. You expect that ordinarily, don't you? When you buy quality goods, real quality goods, you are assured of getting value received, especially at this time when enameled ware is approximately sixty points higher than it was a while back. So that, instead of getting additional value for the money, you are simply covering the raise.

"Now, Mr. S. I believe you are a man who admires nice things, and could appreciate a good bathroom. You appreciate the fact that everyone cannot own a bathroom equipped with such lines as these, and while you might be able to get fixtures for a little less money, yet they wouldn't be the best kind, and the day is coming when the word "High Priced" will signify as much in building circles as the word Packard for instance does in the automobile world. Understand, I am here to give you what you want and to sell you all I know about these goods; and you know further that every man knows his own line best, and I am here to say to you that you can't go wrong in buying quality goods every time. I could sell you a cheaper line, where price talks, but I don't want to do that, because that is what sells most of the ware nowadays. I prefer to sell you something where quality talks, not once, but every time you, or may I say your guests, enter and leave the bathroom".

The foregoing does not purport to be a model sales talk, but it gives an idea of how a prospect can be landed.

Good advertising, backed by support such as this on the part of the sanitary engineers themselves, and possibly helped along by the placing of live wires on the road, is the secret of bringing high-priced ware to its proper plane, and the chief responsibility rests with the ability of the trade itself.

SUCCESS

There is but one straight road to success, and that is merit. The man who is successful is the man who is most useful. Capacity never lacks opportunity. It cannot remain undiscovered, because it is sought by too many anxious to utilize it..

A capable man on earth is far more valuable than any precious deposit under the earth, and the object of a much more vigilant search.—W. Bourke Cochrane.

BE STRONG

Links in one's business are the goods and service upon which strength, power and lasting reputation are built.

Poor quality goods and disinterested service denote weakness, and lack of business success or lasting reputation.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

THE greatest activity during the time since last issue has been in the market for wrought iron pipe. No less than two changes in an upward direction have been recorded since last issue and three changes within two weeks. The advance on wrought pipe altogether within the period between March 29 and April 10 amounted to approximately $16 per ton. Scarcity of raw materials is given by the manufacturers as the reason for the advance. Black and galvanized sheets have also been moved to higher levels. There has been a weaker market for old materials, and particularly with respect to old copper. This has been caused by the action of certain companies in the United States offering to furnish the United States Government with the ingot copper at 16¾c per pound. This has naturally had a depressing effect on the price of copper and brass, and will come as a welcome movement in market conditions. Considerable trade in valves is reported through the establishment of new shipbuilding plants. Valves are also in request for the construction work on these ships. Malleable fittings have been increased in price and cast iron fittings have also been advanced. Trade in plumbing lines has been fair during the week, coming largely from new industrial plants that are being erected.

TORONTO, April 13.—The greatest activity for the plumbing trade is now coming through the increased demand for marine work of various kinds. Manufacturers of valves report that new shipbuilding plants are being erected and that there is a heavy business developing from this source. In the construction of ships there has also been increased activity through the operation of the submarines which is making it an absolute necessity that every effort be expended toward the increase of tonnage. Canadian shipbuilders are meeting the situation and not only extending present plants but building new ones. Present movements have all been in the upward direction with one exception, namely, that of old copper and brass. Weakness has been caused in this market through the lower prices that are being paid for the ingot metal.

Wrought Pipe Again Advances $6 Per Ton

WROUGHT PIPE. — Following the two advances in pipe that were recently made, the first of which was announced in our last issue, a further advance has been made effective on April 10. The combined amount of the advance of the two previous increases amounted to $10 per ton, while the increase that is now provided for amounts to approximately $6 per ton. In certain instances the list price has been increased as in the case of the ¼-inch buttweld which is now $8 as compared with $6 formerly. In the case of the ⅜-inch buttweld the list has been changed from $6 for heavy and $7.50 for extra heavy to $8.50 for heavy and $8 for extra heavy. Cutting extras have been readjusted also. New net prices are shown in a panel elsewhere in this issue.

WROUGHT IRON PIPE PRICES.
Effective April 10, 1917, superseding all previous lists.

	Black	Galvanized
	Per 100 feet	
Buttweld—		
⅛ in.	$ 4 50	$ 6 00
¼ in.	4 32	6 36
⅜ in.	4 32	6 36
½ in.	5 61	7 18
¾ in.	7 02	9 14
1 in.	10 37	13 52
1¼ in.	14 03	18 29
1½ in.	16 78	21 86
2 in.	22 57	29 42
2½ in.	36 27	47 09
3 in.	47 43	61 58
3½ in.	58 88	75 90
4 in.	69 76	89 93
Lapweld—		
2 in.	25 53	32 01
2½ in.	38 03	48 26
3 in.	49 73	62 18
3½ in.	60 72	78 66
4 in.	71 94	93 20
4½ in.	83 82	108 60
5 in.	97 68	126 50
7 in.	126 70	164 50
7 in.	166 60	213 00
8 L. in.	175 00	223 80
8 in.	201 60	257 80
9 in.	241 50	308 80
10 L. in.	224 00	286 40
10 in.	288 40	368 70

Terms 2% 30 days, approved credit.
Prices Ontario, Quebec and Maritime Provinces.

Malleable Fittings And Cast Fittings Up

SOIL PIPE, FITTINGS.—An advance of from 7½ per cent. to 10 per cent. has been made effective in the selling price of malleable fittings and cast iron fittings through the change of the discounts. Where formerly the discount on malleable fittings was 10 per cent. they are now being quoted at net list. Cast iron fittings on the other hand are now quoted at 35 per cent. off list as compared with 35 and 5 per cent. formerly. Quotations on soil pipe remain unchanged, and fittings were in steady market.

	Discount
Medium and extra heavy soil pipe, 6-inch and under	55%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	60%
Malleable fittings	Net list
Cast iron fittings	35%

Shipbuilding Industry Causes Valve Demand

VALVES.—Manufacturers of valves report that there is a heavy demand for valves for marine work at the present time. This is caused not alone through new ships that are being built and old ones that are being repaired, but also because of the construction of new shipbuilding plants. With the depredations caused by submarines on shipping there has been an increased stimulus given to the shipbuilding industry in Canada. There has been a shading upward in the price of certain valves, the range of discounts on ground work now being from 35 to 53 per cent. off list as compared with 39 to 53 formerly. Certain types of globe, angle and check valves also have a slightly lower range.

Ground work	35-53
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	10
Radiator valves, standard	15
High grade	15
Patent quick opening valves	55
Basin Cocks—	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	35-40
Radiator valves, standard	40
Radiator valves, Jenkins disc.	45
Radiator valves, quick opening	45

Closet Woodwork Prices Withdrawn

ENAMELWARE, RANGE BOILERS.—Following the advance made in closet sets and which was announced in our last issue the prices on wooden parts for closets have been practically withdrawn, now being sold at prices that prevail at the time of sale. In enamelware prices have held steady during the past two weeks and range boilers remain unchanged.

30-gallon range boilers, standard	$10.50
30-gallon range boilers, extra heavy	13.00
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	25.80
Bathtubs, 5½ ft.	29.40
Sinks, roll-top, 18 x 30 in., staple	13.25
Closets	21.00

Oakum Market Continues Steady

OAKUM.—There was a steady market for oakum products during the time since last issue with a fair demand reported. There is a continued firm market for oakum in the United States and the local market is sympathetically affected by the condition there. Prices remain unchanged.

	Per 100 Lbs.	
Plumbers' spun	$ 8.00	$ 9.00
Best American	20.75	21.00
U.S. Navy (American)	20.00	20.35
Clipper U.S.	17.00	....
U.S. Navy (English)	17.50	....

Black And Galvanized Sheets Up In Price

SHEETS, PLATES.—An advance of 50c. per hundred has been recorded in the price of black sheets during the week, although there is still a range in the market. Some of the dealers anticipate that with the opening of navigation on Lake Erie greater quantities of sheets and plates can be brought over from the United States by two ferry lines that ply to Canadian ports. In this way it is thought there may be a better chance of getting larger supplies. Much depends on the railway situation in the United States which will be dominated by the country's needs in the transportation of war supplies. An advance has also been registered in Apollo brand galvanized sheets in certain quarters amounting to 50c. per hundred pounds. On 10¾ ounce the new selling price is now $8.50, 28 gauge is $8.20, 26 gauge $7.90, 22-24 gauge, $7.75, 18-20 gauge $7.60, 16 gauge $7.45, 14 gauge $7.35. Following is the range of prices now prevailing in the market for black sheets:

	Per 100 lbs.	
10 gauge	$6.90	$....
12 gauge	7.00	6.55
14 gauge	7.35	6.45
16 gauge	7.40	6.35
18-20 gauge	7.05	....
22-24 gauge	7.15	....
26 gauge	7.20	6.40
28 gauge	7.25	6.50
29 gauge	....	6.60

Lead And Zinc Products Are Steady

LEAD AND ZINC PRODUCTS.—The demand for lead and zinc products continues to be fairly good with prices holding steady. As to what the ultimate effect of the entrance of the United States into the war will be remains an open question. Dealers assert the time is too short as yet to know whether lead will be in still greater demand and so a necessary firmness in price.

Lead pipe, lb.	$0 16	....
Lead waste pipe, lb.	0 17	....
Lead traps and bends	Plus 10%	....
Lead wool, lb.	0 16	....
Lead sheets, 3 lbs. sq. ft.	0 17	....
Lead sheets, 3½ lbs. sq. ft.	0 17	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 16	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 37	....
Solder, strictly, lb.	0 35	0 37
Solder, commercial, lb.	0 23	0 33½
Solder, wiping, lb.	0 33	....
Solder, wire, lb.	....	0 52
Zinc sheets, per lb.	0 33	....

Corrugated Sheets In Firm Market

CORRUGATED SHEETS.—There is a firmness in the market for corrugated sheets, manufacturers stating that present costs are not on a parity with the cost of raw materials. The demand is light, however, and this is operating to keep prices steady. With the development of a heavier demand there would in all probability be higher prices.

	Per 100 Sq. Feet	
	Galvanized	Painted
No. 28 gauge	$ 6.50	$ 5.50
No. 26 gauge	7.00	6.25
No. 24 gauge	11.00	8.50
No. 22 gauge	12.25	10.50
No. 20 gauge	15.50	13.00
No. 18 gauge	20.00	16.50

Demand For Boiler Tubes Getting Heavier

BOILER TUBES.—With the coming of spring dealers in boiler tubes report the demand is developing. Prices are in a firm position, in sympathy with the American market, but locally there has been no change during the week.

	Per 100 Feet	
	Cold Drawn	Lapweld
1-inch	$24.00	$ ....
1¼-inch	30.00	....
1½-inch	32.00	25.00
1¾-inch	32.00	25.00
2-inch	35.00	26.00
2¼-inch	37.00	....
2½-inch	44.00	33.00
3-inch	47.00	38.00
3¼-inch	....	45.00
3½-inch	59.00	48.00
4-inch	74.00	60.00

Old Copper Takes Big Drop Downward

OLD MATERIALS.—There has been a decidedly weaker tax tone in copper and brass during the week as a result of the offer of one of the largest producing companies to furnish the United States with copper at 16¾c per pound and from the fact that some twelve other concerns have followed the lead taken in this respect. Old heavy copper declined 3½c per pound during the week and is now quoted at 26c. Yellow brass is quoted down 1c at 16c and red brass at 21c is also down 1c. There has been a good demand for old materials of all kinds but the weakness in copper has demoralized the market for that commodity.

	Per lb.	
Tea lead	$ 0.06½	.....
Heavy lead pipe	0.09½	.....
Yellow brass	0 16	.....
Red brass	0.21	.....
Light brass	0.10	.....
Heavy zinc	0.09½	.....
Heavy copper	0.26	.....
Old cast iron, per ton	18.00	.....
Stove plate, per ton	14.50	.....
Old rubbers, boots & shoes.	0.08½	.....
Overshoes, lumbermen's rubber boots	0.06½	.....
Bicycle tires	0.02½	.....
Auto tires	0.06	.....

Metals Unchanged With Good Demand

PIG IRON.—The pig iron market contines very firm, and prices are still on the up-grade. The Steel Company of Canada have turned their No. 2 furnace at Hamilton over to basic pig iron, and have withdrawn prices on foundry iron. Victoria foundry iron is now being quoted at a nominal price of $45 per ton, Toronto. The situation at Buffalo is very firm owing to the sold-up condition of the furnaces and very low stocks. Producers are quoting $41 to $42 furnace on No. 1 foundry iron.

INGOT METALS. — The metal markets this week are unchanged. There is a good demand, but some consumers are inclined to hold back awaiting developments. The decision of the U. S. Congress to take an active participation in the war did not affect metal prices, as was anticipated in some quarters. Locally business continues very good at unchanged prices.

COPPER. — Prices continue nominal and unchanged, but the market is unsettled, and there appears to be some doubt as to what may develop in regard to values. The recent low price for copper made to the U. S. Government by the producers has caused buyers to hesitate, and what will be the result on the price situation generally is difficult to determine. Local prices are unchanged at 39-40c.

TIN.—The market is very dull in New York, with very little business doing, due to the political situation. Prices advanced recently in London, but trading has been light for several days. Local price, 50c. per pound.

TIN. — Prices of tin locally are unchanged with quotations at 55-57c. lb.

SPELTER.—No change is noted in the situation locally. Prices still range from 13c. to 15c. lb.

LEAD. — There is no change in the lead situation. Lead is quoted locally at 12-13c. per pound.

ANTIMONY.—The market of late has shown signs of strength. Locally prices range from 35-36c. lb.

ALUMINUM.—The market is dull and prices unchanged at 68c. per pound.



IMPORTANT CONFERENCE

A conference was held in Montreal on Thursday, April 5th, between the sanitary and heating engineers and the manufacturers and jobbers of boilers, radiators and heating supplies.

Certain important matters were taken up, which the trade were desirous of having remedied. The manufacturers agreed to place matters on a better basis, to the mutual benefit of one and all.

NEW CATALOGUE.

A beautifully gotten up catalogue is being issued to the trade by the Wallaceburg Brass & Iron Mfg. Co., Ltd., Wallaceburg, Ontario, which describes every form of Quaturn Faucets, not only for lavatories, but for bath cocks, pantry, sink cocks, with both brass and iron bodies, the latter being for factory purposes only. Those desiring to procure one of these books are asked to write for catalogue A. to the above address.

CAPT. MATTHEWS WOUNDED

Capt. John Irving Matthews, who has been serving at the front for two years or more, having gone away as a staff sergeant, has been reported wounded. No particulars were received from Ottawa by his wife as to the nature of his wound, but a cable from Capt. John Hutcheson, who is now at Epsom, Eng., stated that he was wounded in the shoulder, but not dangerously. Capt. Matthews succeeded Capt. Hutcheson as quartermaster of the battalion. He only held the rank of lieutenant for one day. Capt. Matthews was for many years one of the staff of men in the employ of John Wright, sanitary engineer, Church street, Toronto, and later qualified and held a position as plumbing inspector for the Medical Health Department. A good mechanic and a born soldier, he had been in the Queen's Own for 25 years. He is 47 years of age, and was born in Toronto. He has two children.

CHAS. T. BODDINGTON PASSED ON

At St. Augustine, Florida, U.S.A., on Saturday, April 7, Mr. Charles T. Boddington died in his 60th year. He was for twenty-two years with Purdy, Mansell & Co., Toronto, the last ten years as superintendent. Every member of the old guard in Toronto knew Charlie well. He was looked upon as being one of the ablest mechanics in his line, and specialized on sprinkler fire extinguishing work. He had not been well for some months and it was thought that a thorough rest and change would do him good. The late Mr. Boddington was born in Southampton, Eng., and came to this country forty-five years ago. He was a member of Victoria Masonic Lodge, and is survived by his wife, three sons, William and Herbert, of Toronto, and Norman, who went overseas with the 44th Winnipeg Battalion, and two daughters, Misses Gladys and Margaret, at home, 142 Mavety street.

CHANGE OF ADDRESS

Messrs. F. Barber and R. O. Wynne-Roberts, consulting engineers, late of 57 Adelaide street East, Toronto, have moved their place of business to Bank of Commerce Chambers, 40 Jarvis street, cor. of King and Jarvis streets, Toronto.

CAME TO GRIEF

Some of the boys in Toronto are wondering how Jack Gray got his buzz wagon so thoroughly incapacitated; others declare that it looks as if it had been trying to make too sudden an acquaintance with one of the "tanks" that are making history at the front.

HEAT BUILDINGS BY OIL

New Proposal Being Considered by Ontario Government

With the expected return after the war of prices of fuel oil to those which prevailed before the war, the Provincial Government will, it is announced, probably employ fuel oil entirely for the heating of the Parliament Buildings, thus effecting an economy, and making the Government no longer dependent upon a supply of coal. The cost of changing the furnaces from coal to oil-burning will be small. A large underground reservoir, capable of containing an ample oil supply for a considerable period, will be laid in the court yard to the rear of the Provincial Buildings.

"LUCK" ACCORDING TO COBDEN

Luck is ever waiting for something to turn up; labor, with keen eyes and strong will, will turn up something.

Luck lies in bed and wishes the postman would bring him the news of a legacy; labor turns out at six o'clock, and with busy pen or ringing hammer, lays the foundation of a competence.

Luck whines; labor whistles. Luck relies on chance; labor on character.

TORONTO SOCIETY MEETS

Discussion on Main House Trap.

The above society held their regular monthly meeting on Wednesday the 21st, inst., and were entertained by an address from our good friend, E. Lewis LeGrow, on the "Main House Trap Breather."

This was one of a series of addresses that is being arranged for the monthly meetings, by Chairman Fred Wiles, of the Educational Committee.

The above address, proved both interesting and educative, and the thirty odd members who were in attendance, all expressed their wish for the continuation of the good beginning made.

Mr. LeGrow ably placed before the members, numerous arguments and authorities for the doing away with the main house trap, but notwithstanding the fact that these arguments were very convincing, several of the members voiced their disapproval of same, and contended that the Main House Trap, was a very essential feature on every house drain, from the Safety First standpoint.

Many points were brought out in the course of the address, and questions were asked and answered by Mr. LeGrow. Another evening is to be arranged for, the opposite side to bring out their arguments in favor of the trap being used, and a good night was brought to a close with a vote of thanks being tendered to Mr. LeGrow, by President Fred Gentle, on behalf of the members, for his able effort on this occasion.

The Next Meeting

Chairman Wiles, promises everyone another treat, for the April meeting, to be held on Wednesday 18, for which occasion he has arranged with Mr. D. MacLulick, Accountant of Keiths Limited, to address the members on "Plumbing and Heating Accounting."

This is a question that is of the utmost importance to everyone of the members, and Mr. MacLulick, is one who can handle this problem from every angle. Costs and overhead expenses are given a different tang after hearing Mr. MacLulick explain their ever presence with us. While bookkeeping and credits. one of the bug-a-boos to the average plumber and steamfitter will be explained in such a simple manner as to surprise most of those who looked upon this subject as one too complex to be grappled with by the average craftsman.

Sixty-Two Years in Harness

Came to This Country Nearly Half a Cent ıry Ago — Has Seen Some Great Changes Take Place.

THERE are not many men engaged in the plumbing and heating trade that can look back through sixty-two long years of active service

Sixty-two years is a long time and seems much longer one would think when such a career starts almost from infancy.

In the year 1847 on the first day of June, Robert Paddon first saw the light in that little historic town of Teignmouth on the coast of Devonshire, England. A town then of about 6,000 population, and spoken of by historians as "a town of great antiquity, and one of the most fashionable watering places on the coast.

At the age of eight, he went to work in order to help his mother, his father being drowned at sea, while first mate McKay, working for them on the New Crawford House Hotel, Windsor.

Upon completion of this job, Mr. Paddon was appointed engineer for the hotel, and made gas from coal oil for domestic purposes. Where are the men to-day in our trade that can turn their hand to do real mechanical work. How many know how gas is made? Very few we venture to say. Not that these things are expected of the trade, but it is the ground work leading up to such achievements that really makes the men.

Ambition too was one part in the make up of Robert, and it is said he was also gifted with no small amount of courage, starting in business with the magnificent sum of $15.00 a few tools and a wheelbarrow, and despite the fact



The Paddon Family actively engaged in the sanitary and heating engineering business in Windsor.

of a trading ship. At this age he became apprenticed to the plumbing trade, and received the sum of one shilling per week (24 cents) on the understanding that if he made good he would receive a raise each year of one shilling. Completing his apprenticeship he journeyed to Torquay, Exeter and other nearby towns.

In the year 1870, May 13th, Robert set sail for Canada. Arriving in Toronto, June 1st, he procured a position with the late John Wright, whose sons at present are all in business in Toronto.

After being with Mr. Wright for about 3 years, things got a little slack, and he had to seek greener fields. Answering a want ad. he proceeded to St. Thomas, to take a position with Messrs. Horseman & Horseman, his first job there being on the new Canada Southern Railroad station.

From there he travelled to Detroit and labored under Messrs. Ferguson & that his premises have been twice wiped out by fire, with very little insurance. The business has grown amain. The firm is known now as Robert Paddon & Co., sanitary, heating and ventilating engineers. Sheet metal work also comprises one of the branches of the business.

This progressive concern enjoys a splendid reputation for good work. Some of the largest contracts in the city of Windsor are standing monuments of the firm.

The new M. C. R. Union Depot, the Canadian Bank of Commerce, The Bell Telephone Co. Building, and the I.O.O.F. Temple.

Mr. Paddon met his wife in Toronto. She happened to be a Teignmouth girl whom he had not met until she came to Canada. She became the mother of 10 children, 6 of whom are still living to enjoy the Company of their parents. Two daughters and three sons have been interested in the business, one daughter and two sons are still doing their part in it. One son Capt. A. E. Paddon was wounded six times in the South African war and is now doing duty as Capt. of the Guards and assistant provost Marshall of Ontario.

Mr. Paddon will be 70 years of age on the first of June and still takes an active interest in the business, and declares he is good for another 30 years. When asked what was the chief reason for his success, he replied that the greatest help through rain or shine, storm or calm had been given him by his faithful wife. She has been and still is a great tower of strength to him.

The SANITARY ENGINEER sincerely hopes that this family, father mother and worthy sons and daughters will long enjoy each others fellowship and that their endeavors will be rewarded in the future as in the past.

CANADIAN INDUSTRIAL ACHIEVEMENTS

By Horatio.

"THE whole Dominion pulsates with the dynamic energy of tremendous achievements." Such was the flowery language presented to the readers of one of Canada's greatest daily newspapers. One is delighted to know all there is to know of Canada's achievements, but even though to-day Canada may pulsate with dynamic energy, the dynamic energy and the tremendous achievements are vague statements which tickle the imagination, but give no information of real value.

Tremendous achievements to be of fundamental value to the future prosperity of Canada must be permanent and there is more material benefit to be derived from one industry established with the material object of permanency than many which are transient and only for the period of the war.

Recently an invitation was given to inspect the new 1,500 ton hydraulic press installed by the Canada Metal Co., of Toronto. This presented an opportunity to get at the inner scenes of new industries likely to prove of permanent value to the future prosperity of Canada and the reproduction of the press and other permanent pieces of machinery will no doubt prove very interesting as an example.

Some of the permanent achievements of this concern are related in an article describing the manufacture of lead products, which is published on other pages of this issue.

Records prove conclusively that a large tonnage of sheet lead and other metal products were imported during 1916. To-day there is absolutely no reason why one pound of sheet lead should be imported. Canadian factories can supply all requirements.

These are the industrial achievements which assist to consolidate Canada as a recognized factor in world commerce.

How Lead Products are Made

Lead Pipe Appears to Grow by Itself, and Lead Traps to Writhe Themselves into Being —The Making of Lead Plate Described—The Manufacture of Wire Solder and Lead Foil Described.

From information gathered in a visit to the plant of the Canada Metal Co., Toronto, by Sanitary Engineer Representative.

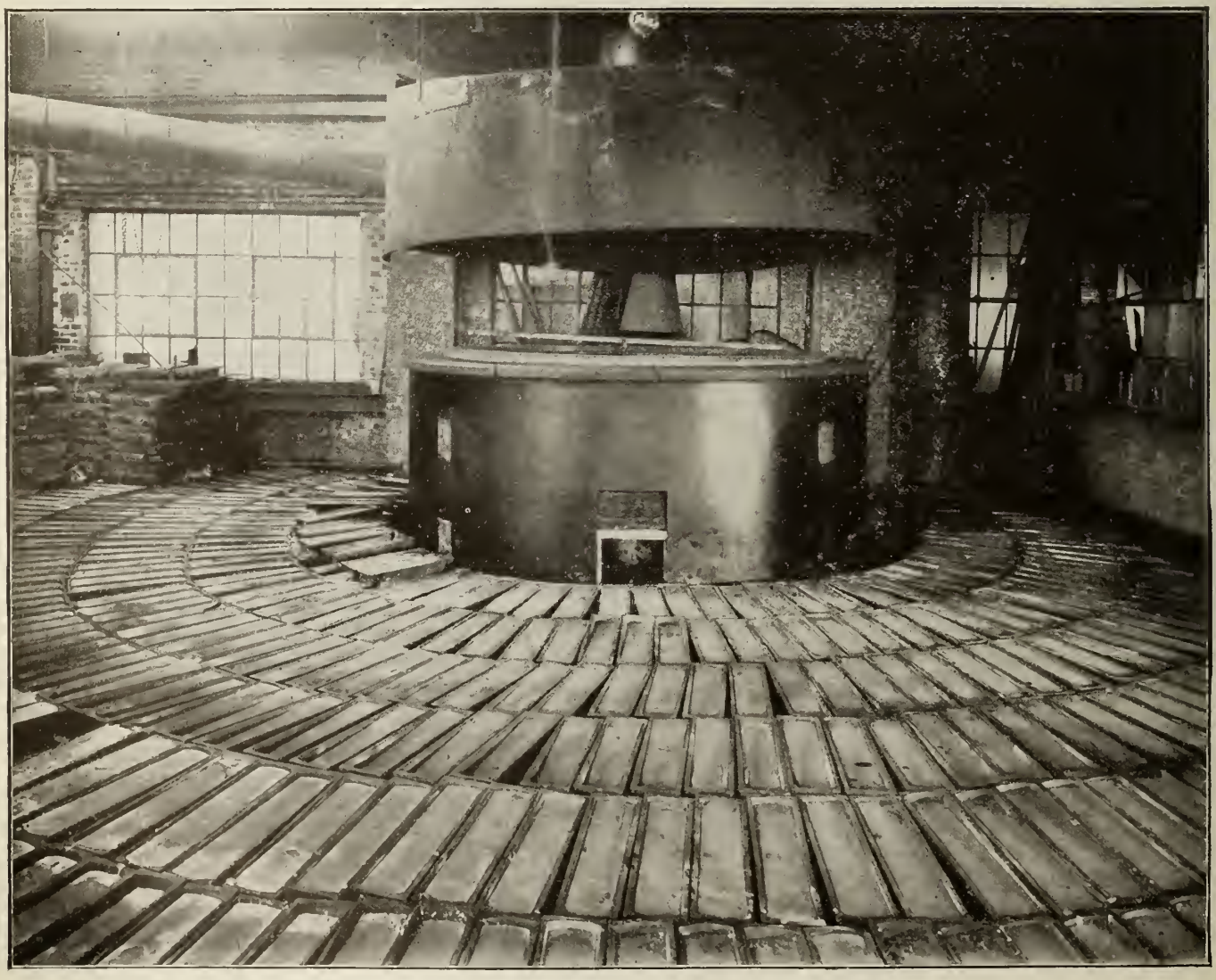
THESE are modern days, and probably the bath room is the very best evidence of this modernity. Now, lead pipe is just as essential to a bathroom as is a piece of soap, probably more so. You are brought face to face with it every day. You could safely venture the guess, however, that out of every thousand persons who have seen a lead pipe, about 50 per cent. would not have the very faintest idea as to how they were made. Probably 97 per cent. of the remainder would have a dim idea flickering about in their brain, that because they were made of lead they must be moulded in some way. That leaves one person in a thousand, who possibly, like the writer, has had the opportunity of visiting a modern metal plant, and can therefore look down from a lofty pinnacle on the others who either know nothing, or who know something that is not so.

Watching Lead Pipe Grow Before Your Eyes

Take lead pipe, for instance. In one of the illustrations is shown a lead pipe machine in operation. The machine is not a particularly imposing affair, but there is something very mysterious for the novice in the way in which the lead pipe simply seems to sprout out of the top of the machine. Lead pipe simply grows before your eyes without any workmen at the machine to give any semblance of reason for the growth.

The explanation of this seeming phenomenon is simple enough. The machine simply consists of a reservoir for holding molten lead which is kept heated in the small furnace seen in the cut beside the press, and is fed into reservoir as required. The bottom of this machine is a hydraulic press that forces the molten lead through a die. This die permits the lead to pour past only in the form of a tube. The lead passing through the confined space is cooled and solidified and gradually ejected through the die opening in the top of the machine.

The machine illustrated herewith is disgorging a pipe full 12 inches in diameter, probably the largest type of lead pipe made. A 12 foot length of the pipe weighs 542 lbs. This same machine by the substitution of a different type of die can be made to produce a 32 cord pipe, probably the smallest lead pipe made, something smaller than the average telegraph wire, with an opening about 1-32 of an inch in diameter. It is easily seen then that these machines are



The largest metal melting pot in the British Empire.

capable of an enormous number of uses. As a matter of actual business practice, of course, it would not be entirely a paying proposition to have to make these numerous changes, so a goodly number of machines are used to make certain definite styles of pipe.

Difference Between Lead Pipe and Waste Pipe

Technically lead pipe is sold in rolls of approximately 175 pounds. It runs in calibre from ¼ inch to 3 inches and in four grades, light, medium, strong and extra strong. The difference in these grades is a difference of wall thickness which naturally makes a material difference in weight.

In what is known as lead waste pipe a different system of handling is adopted. Because these pipes average as a rule larger in size running from 21¼ inches to 12 inches in diameter, it is not generally feasible to sell this pipe in roll. For one reason the weight would be too great. The system with the waste pipe is to sell it in eight foot lengths. which is the standard size for waste pipe.

These lengths are simply cut off with a saw as they come from the machine a standard being set above the machine so that the cutter can see when the required length has been reached.

The Making of Lead Traps

It has been described how the lead pipe sprouts from the top of the machine. In making these traps the outcoming lead pipe behaves more like an annoyed snake than anything else. The machine in which these are made though working on the same principle as the one described above is somewhat different in shape. The two big drums that appear in the illustration lie at each side of the mouth of the machine, if such it may be called. Instead of one hydraulic press driving the molten lead from below, there are two such presses, one driving from below, the other driving from the side. These two presses are controlled by a lever in the hands of a workman at the side of the machine.

After the molten lead has cooled to a certain temperature, for it must be at a certain temperature if the pipe is to be properly made, this temperature being shown by a gauge in front of the leverman, the lever is pulled in one direction, this sets the first press in motion. Pressure is brought to bear on the molten lead and the pipe begins to grow above the machine. When about a foot of this has been produced the lever is again moved, the straight pressure shut off and the lateral press comes into operation, at once the pipe seemingly by itself begins to turn over in a hoop. When the particular curve required for the trap that is being made has been reached, the straight pressure is again applied and the lateral pressure shut off and the trap grows straight out again. When it has grown about a foot above the machine another workman deftly saws it off above the machine, and the trap except for the opening in the bottom which is later affixed by hand, is completed. There are six different forms of traps known as the "Full S," "⅜ S," "½ S," or "P. trap," "running trap," "running V." and the "Bag Trap." In addition to these, there are bends. All these varieties can be made at will by the operator, by a manipulation of the different pressures. It is a simple enough process as described. But to stand and watch this lead pipe to all appearances just shaping itself into the shapes desired, gives one the strange impression of having watched a thing manufacture itself.

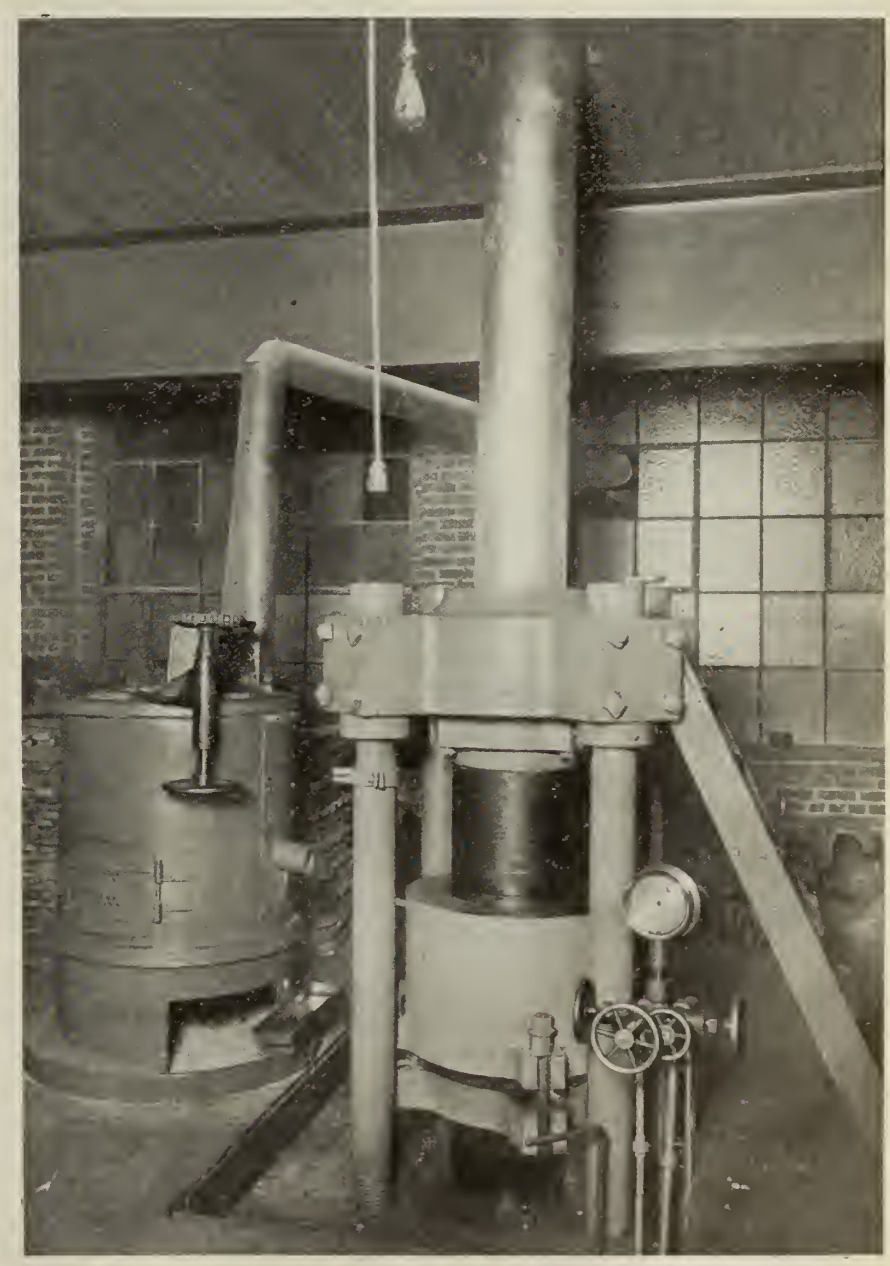
The Making of Wire Solder

Everyone is familiar with the long sticks of plumbers' solder, but the solder in wire form is not possibly so well known though it is extensively used by canners, electricians and munition makers. For this latter work a special high-grade is employed.

This solder strange as it may seem is made in a similar way to lead pipe. Indeed by the substitution of different dies even the machine illustrated as making a 12-inch lead pipe could be adapted to making wire solder. By means of the hydraulic press this solder material is forced through the small die and comes out a long thin wire. The only difference is that in place of one wire being made at a time, the writer saw 18 wires all being produced by the one machine at the same time. These wires are carried up to the roof and over rollers which conduct them to a row of drums. Once there is a sufficient amount collected the drum is taken to a machine which winds the solder in reels. At least the lighter wire solders for electricians and glaziers are so handled, either in ten pound spools, 25 pound coils or 100 pound reels.

The melting and refining of lead has become more of an art these days than

(Continued on page 37.)



Lead Pipe-making Machine—a 12-foot length of the 12-inch pipe shown at the head of the machine weighs 546 pounds. The machine at side is the crucible for melting the lead.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHERE IS THE TROUBLE

Editor THE SANITARY ENGINEER:

Enclosed you will find sketch of a job we installed and which does not work right.

We would like a little information on same, when we open the hot water taps we can draw about a pail of hot water and then the water comes cold and will circulate through the coil in the furnace with cold water.

The coil heats the water in the range boiler all right, but we cannot get the hot water out, we have not tried the gas water heater yet, as there is no gas in the house.

A.L.S.

The sketch submitted by A. L. S. is reproduced in Fig. 1 and shows rather a peculiar installation, though it may be that on account of lead room being very limited, the one tee only was used. The lower connection to the boiler, too, is a little out of the ordinary, as it will be seen that the water from the coil in the furnace must travel through the two tees at the bottom of the gas water heater, before it can reach the boiler.

Now, the trouble we believe is caused by having the ¾ tee from the coil to the top pipe on the gas water heater, this pipe should be connected into the tee at top of boiler as shown in Fig. 2, and the lower connection changed. One thing which should always be taken into account is that all connections must be made as direct as possible and as independent as possible too.

Fig. 2 shows that either the coil at the furnace on the gas water heater can be removed without disturbing in the least either one which may be wanted, both work entirely independently of each other.

It may be that the two tees shown in figure 2 cannot be used. In that case simply use a tee with a bull head, that is one inch centre looking down to the boiler, the ¾ inch end being connected to the gas water heater and a half inch hot water branch to supply the fixtures.

See page 48 for Fig. 2.—Editor.

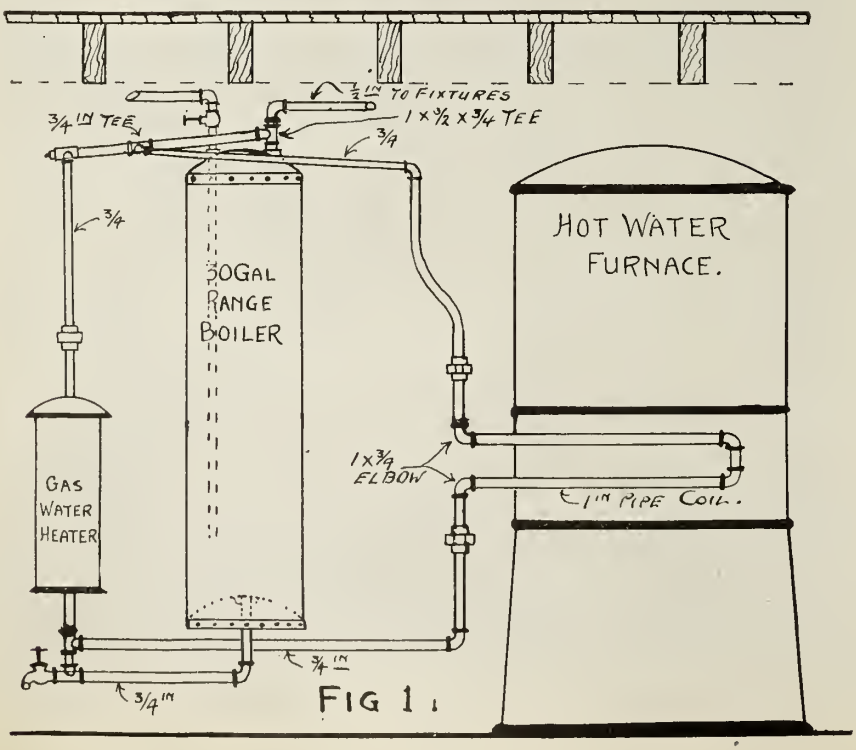


FIG 1.

New Patents

No. 172,059

James Flockhart, Denver, Colorado, U.S.A., 26th September, 1916; 6 years. Filed 11th July, 1916. Receipt No. 267,636.

Claim.—In a siphon mechanism for low flushing tanks for closets, the combination with the tank and means for maintaining the normal water level therein near the top of the tank, of a discharge duct of substantially uniform diameter extending vertically through the bottom and up into the tank whereby the effective portion of the duct is extended into the tank and correspondingly lengthened, an extension carried by the duct and forming a continuation thereof of greater cross sectional area and capacity than the duct below the extension, the upper edge of said extension being slightly below the normal water level in the tank, a vertically movable cylindrical member working in said discharge duct extension and of greater cross sectional area and capacity than said duct below the extension, there being lateral openings in said movable member of a size to admit a volume of water to the extension when the movable member is elevated greater than the capacity of the duct, an annular valve on the outer side of the movable member above the lateral openings adapted to seat on the extension of the discharge duct, andf a short siphon leg located

(Continued on page 48.)

TRADE PENBERTHY MARK

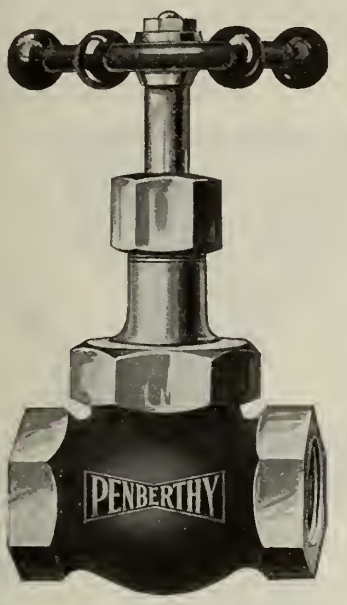
COMPODISK

BRASS VALVES

GATE

IN

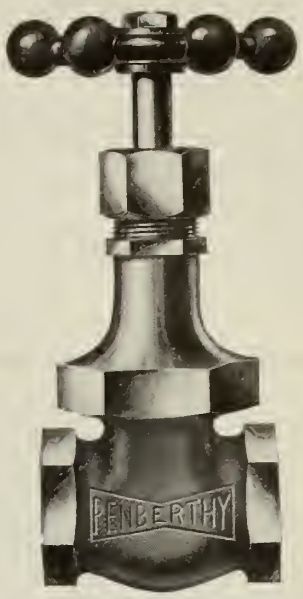
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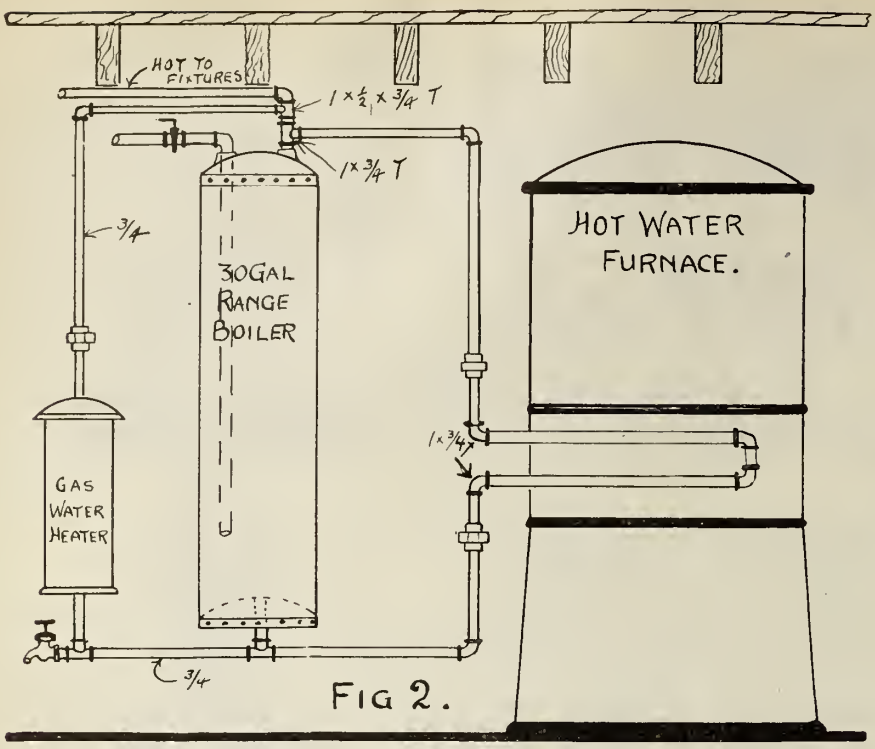


FIG 2.

bodily at one side of the extension whereby water may flow from the tank directly into the extension, and having its only discharge communication with the upper portion of the movable member above the lateral openings and its lower entrance end located at a point at all times near the bottom of the tank whereby the starting water directly entering the enlarged duct extension through the lateral openings and the water flowing through the short siphon leg is taken from widely separated points at different levels in the tank.

No. 171,736.

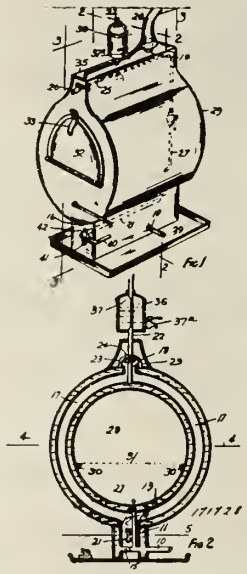
Wales, Australia, 5th September, James D. Jackson, Sydney, New South 1916; 6 years. Filed 23rd. Sept., 1915. Reeeipt No. 256.270.

Claim.—1. In a continuous flow water heater, eoneentric water passages, a bifureated flue passage formed between said water passages, the limbs of said flue passage being of equal length and cross sectional area, a common supply connected at the bottom to said water passages, a firebox eommon to said flue passage, and an exit communicating at the top of said flue passage.

2. In a continuous flow water heater, eoneentric water passages, whereby an annular chamber is formed, vertical partitions to form a vertieal series of bifurcated flue passages, a firebox eommunieating at the bottom with said flue passage, and an exit conneeted at the top to said flue passages.

3. In a continuous flow water heater, eoneentric water passages, a bifureated flue passage within the annulus to form opposite water passages, a horizontal firebox at the junction of said flue passage, and a flue exit disposed at the top end of said flue passage and in the same vertical plane as said firebox.

4. An improved continuous flow water heater eomprising a pair of eoncentric water passages, a water jacket communicating with the outer of said water passages, a firebox within said



No. 171,728. Water Heater.

water jacket, a bifureated flue passage originating at said firebox and surrounding the inner of said water passages, an exit connected to said flue passage, a vent interposed in the connection between said exit and said flue passage.

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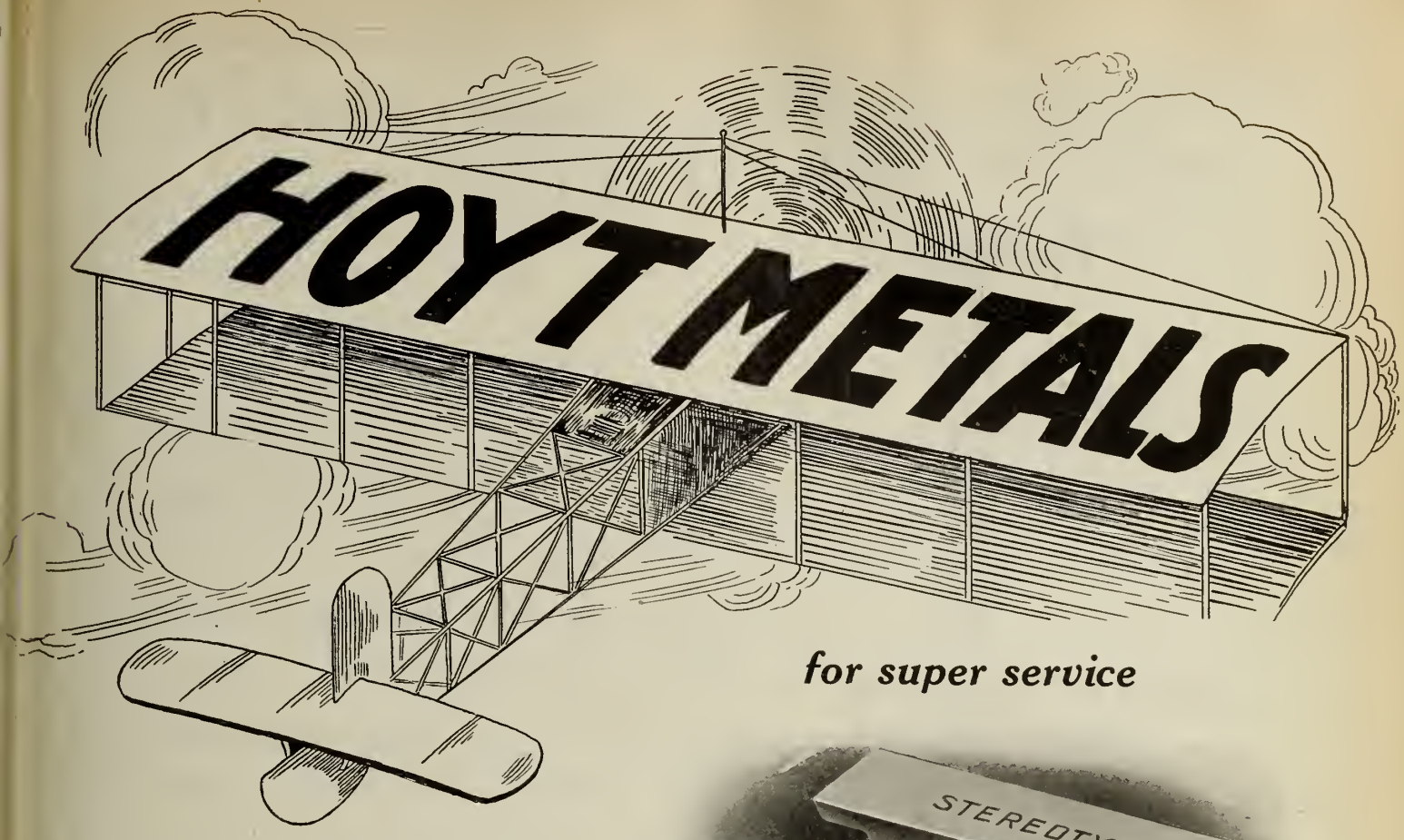
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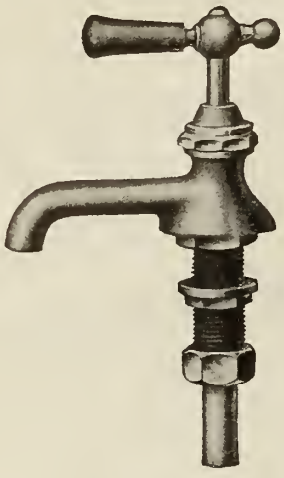
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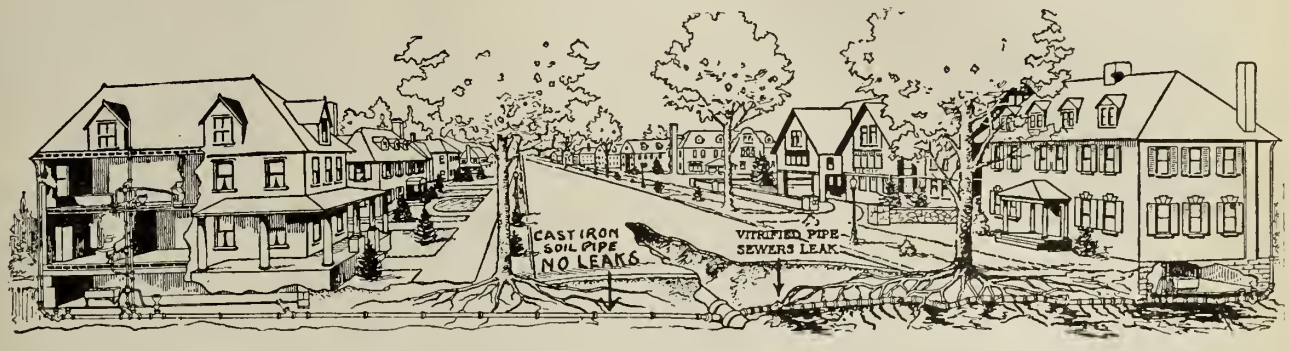
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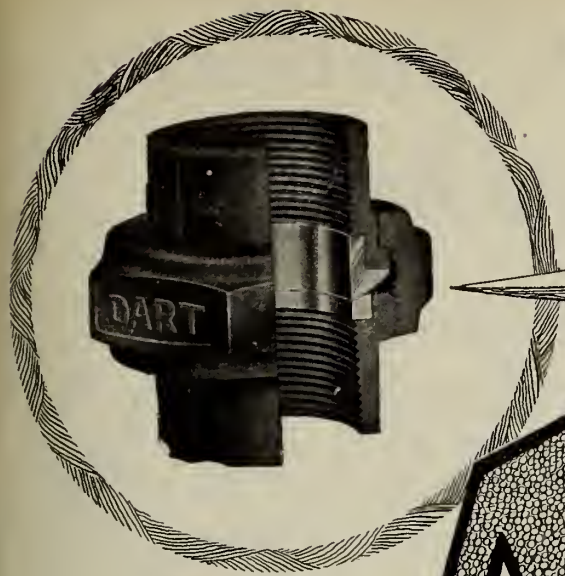
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TRADE DART MARK



DART

UNION PIPE COUPLINGS

Bronze to Bronze at the Joint

Fig. 1.

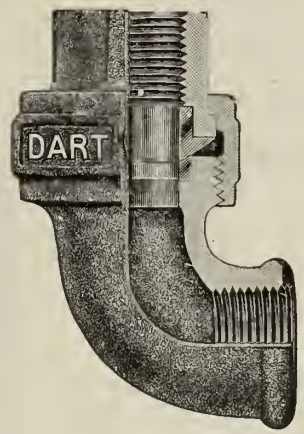


Figure 1 shows a combination that saves you two threads.

Fig. 2.

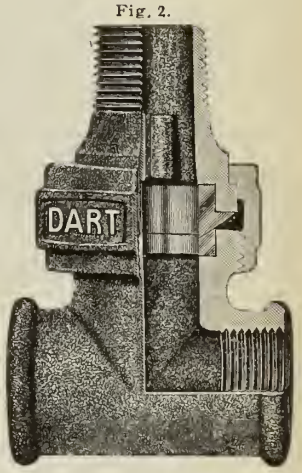


Figure 2 shows a combination of T, Union and Nipple.

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Toronto, Canada

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Figure 3 is invaluable where several fixtures are to be branched off main lines of piping. saves one nipple or piece of pipe and two threads.

Fig. 3.

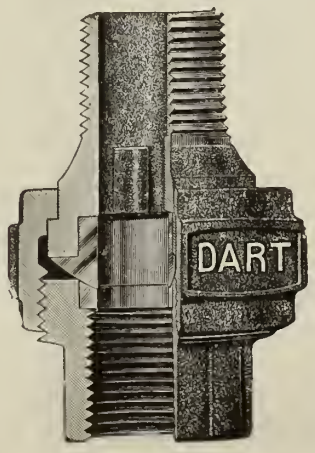


Fig. 4.

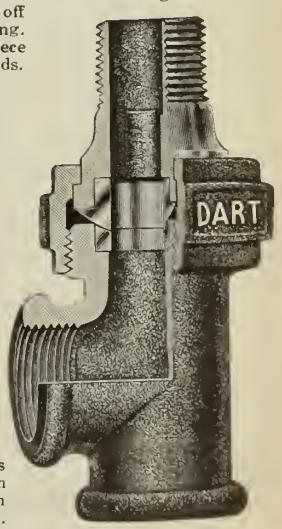


Fig. 4 shows a combination of T, Union and 2 nipples.

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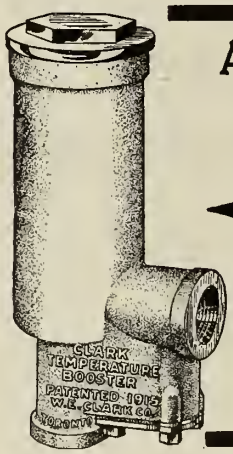
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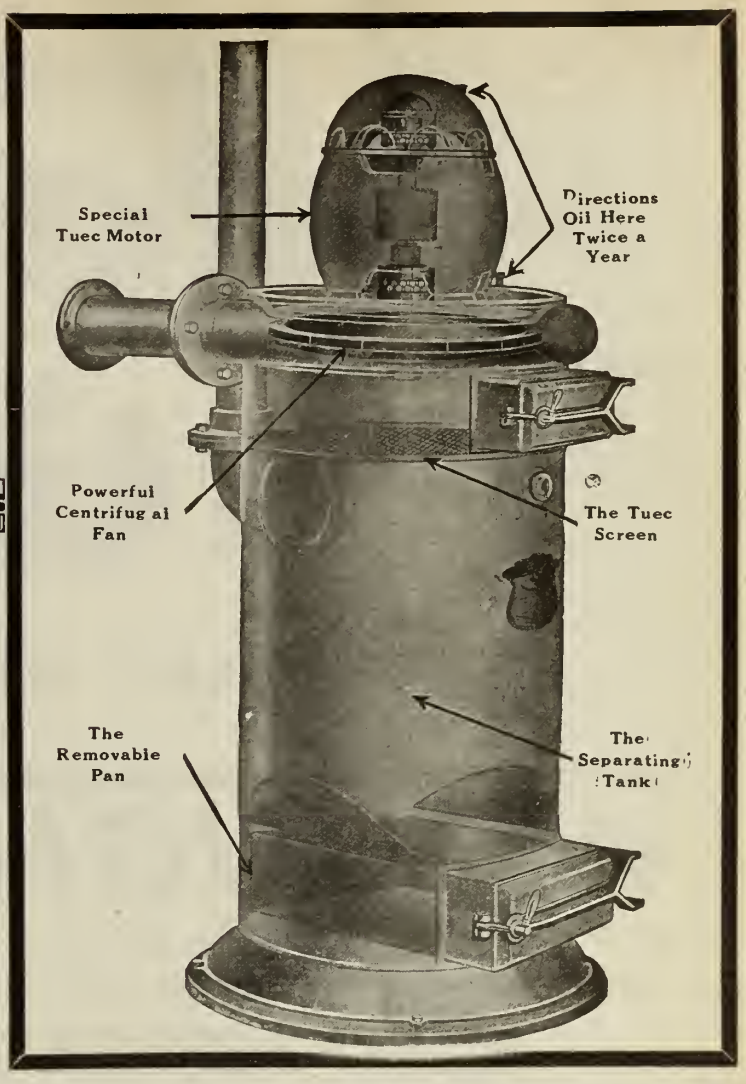
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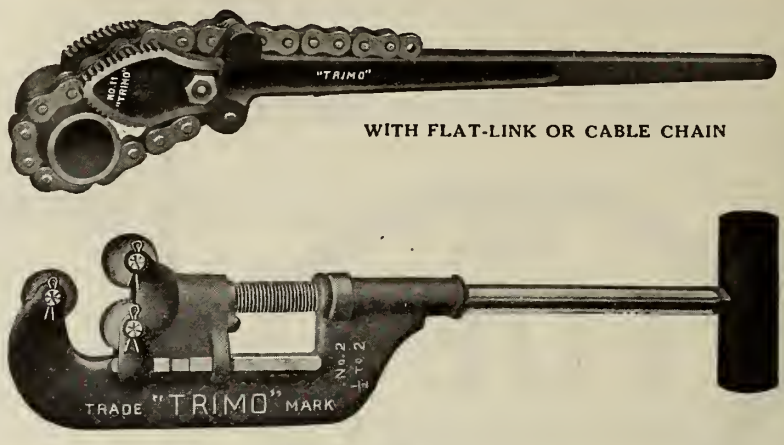
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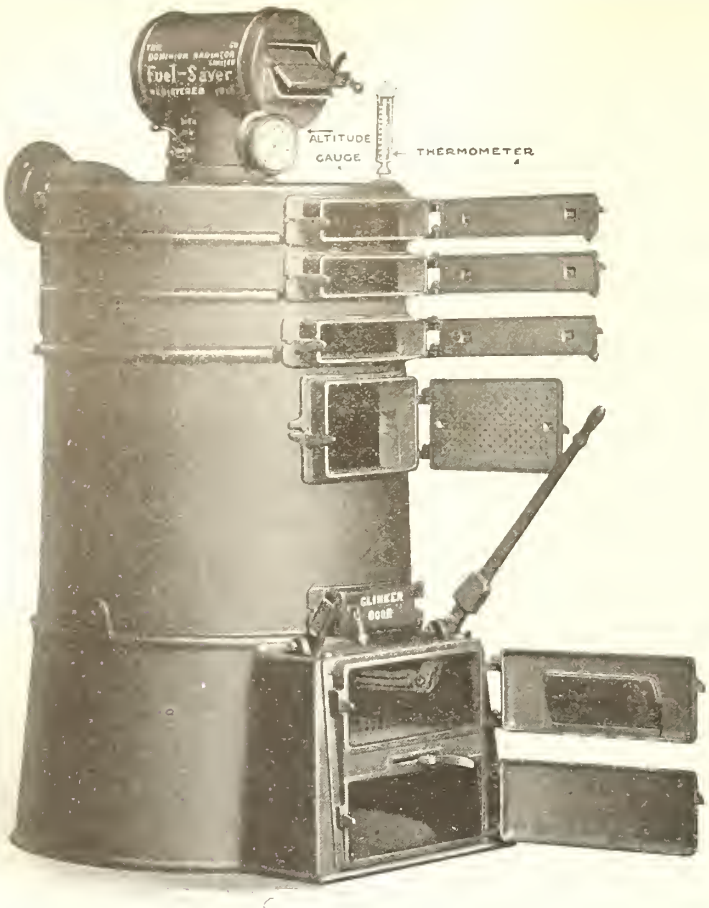
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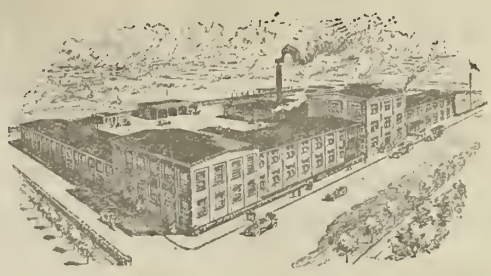
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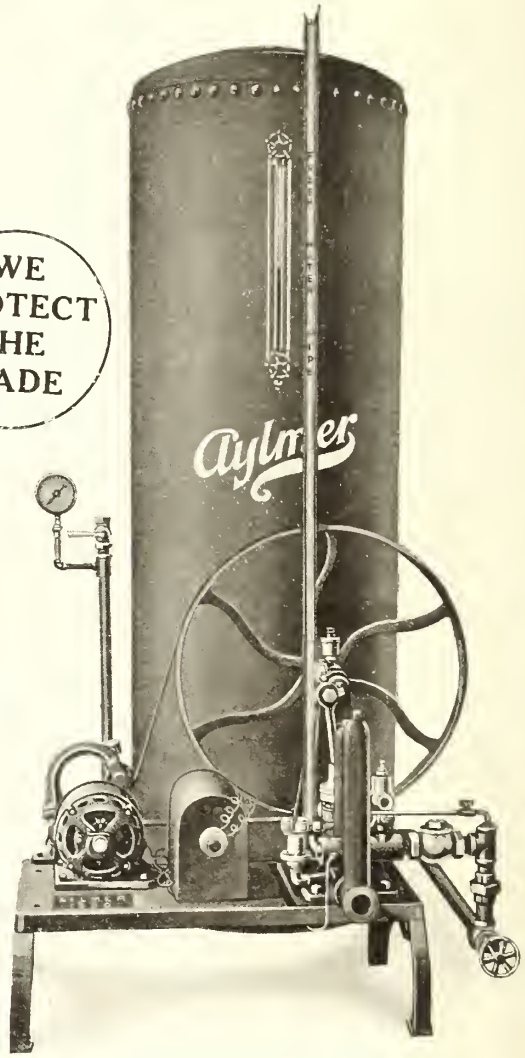
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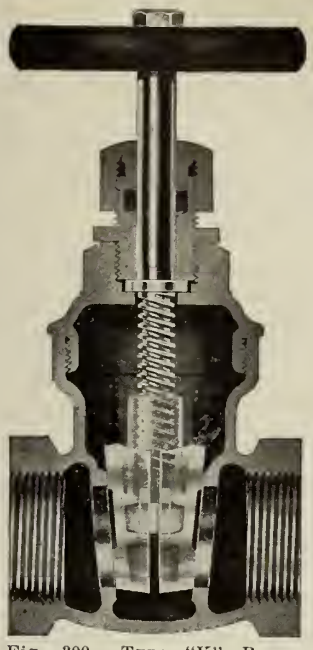


Fig. 300. Type "K" Brass Gate Valve. Screwed. (Sectional View)

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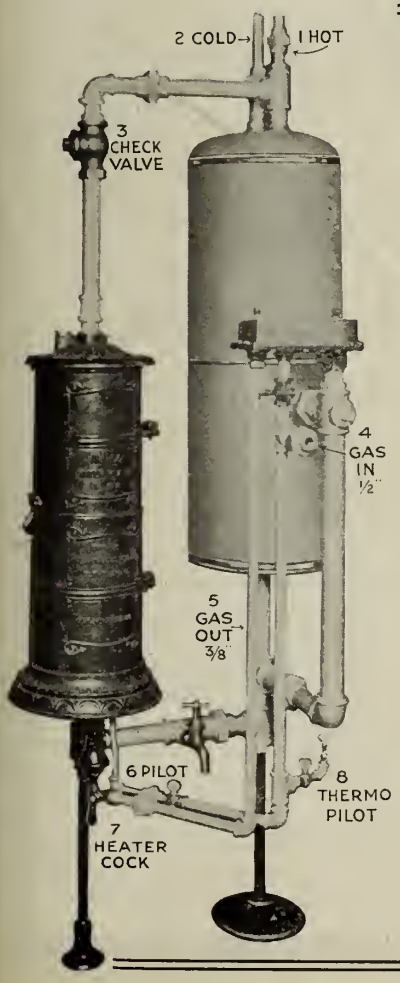
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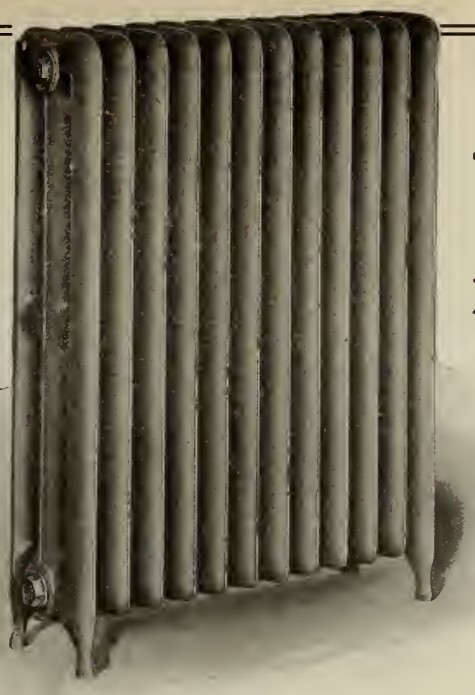
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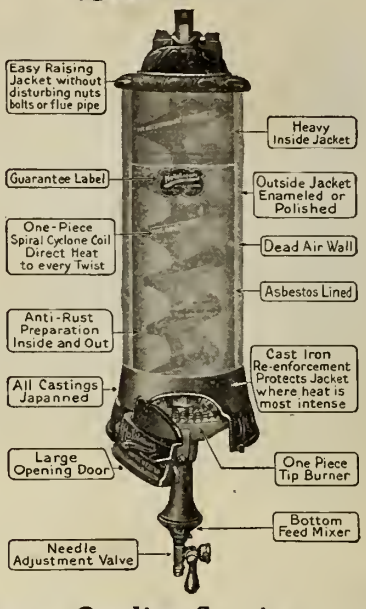
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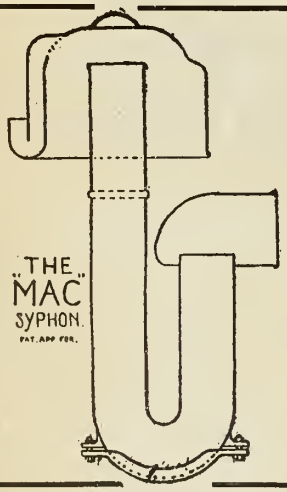
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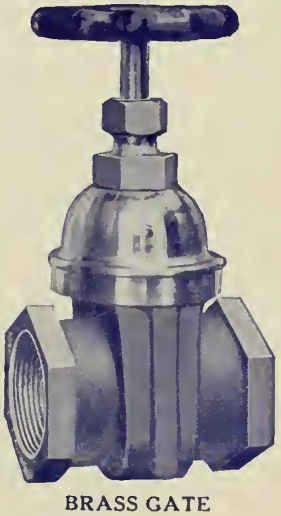
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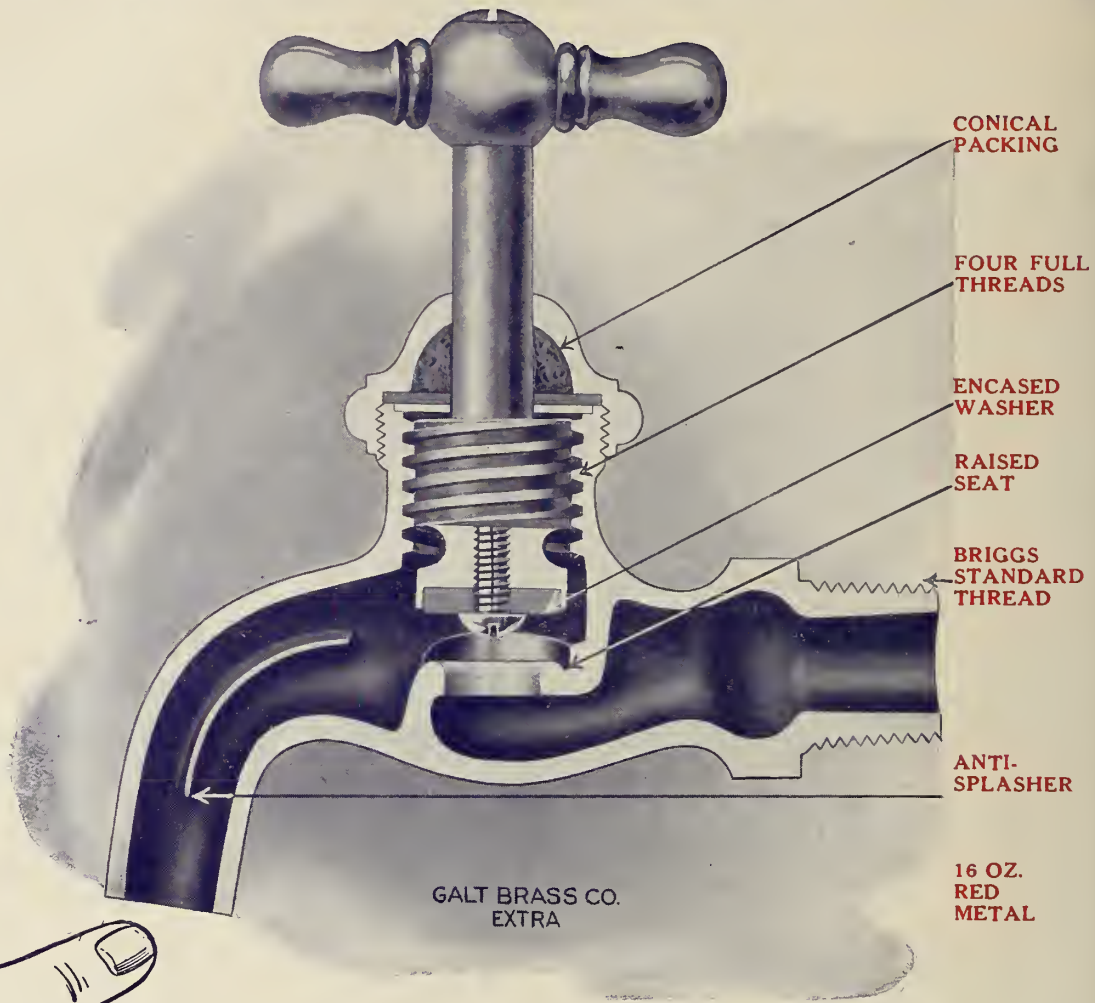
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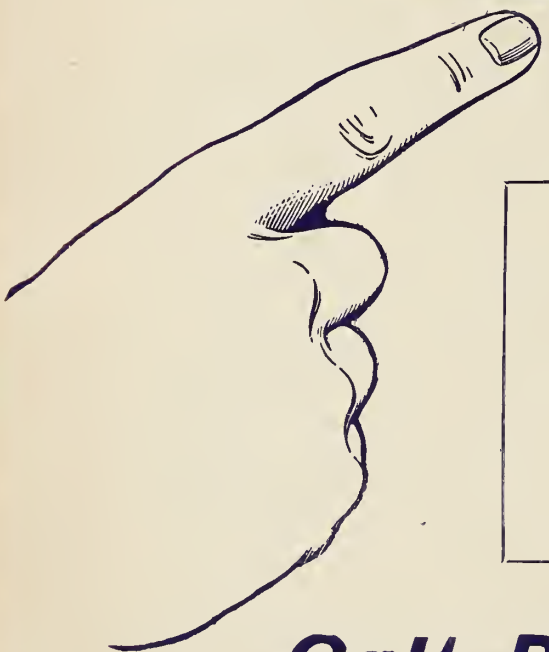
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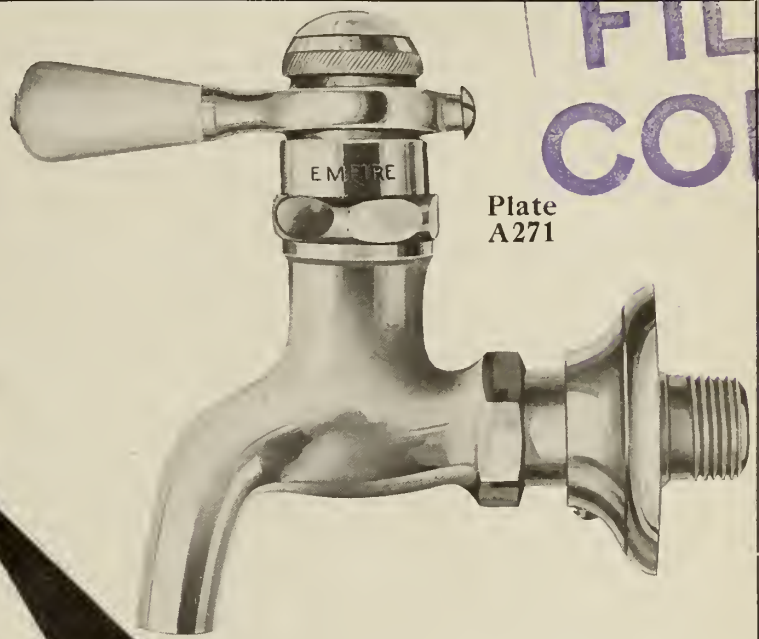


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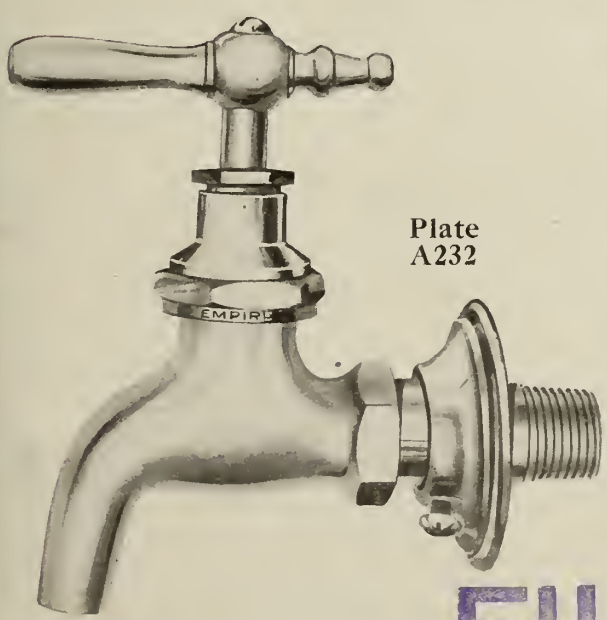


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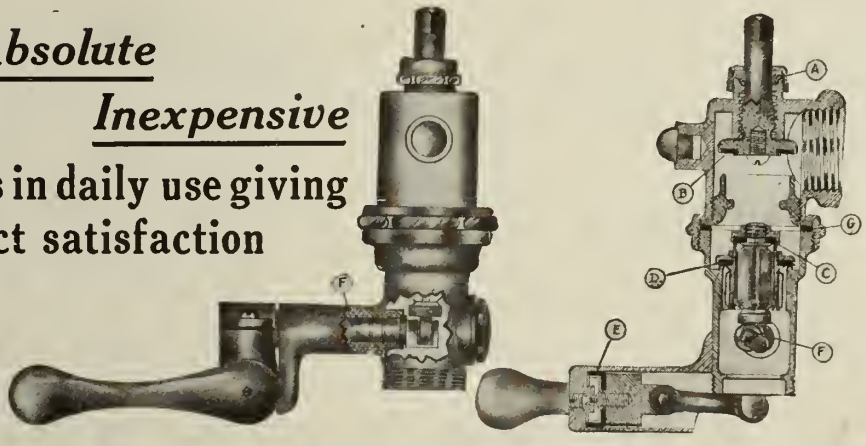
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In the May issue of MACLEAN'S, in addition to the remarkable article announced above, are the following notable features:

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By Arthur Stringer, Hopkins Moorhouse and Mary Gaunt

These stories are Canadian in their background and are good. MacLean's is doing a very meritorious work in developing and introducing new Canadian writers and writers on Canada.

Two Good Serials

By Sir Gilbert Parker and James B. Hendryx

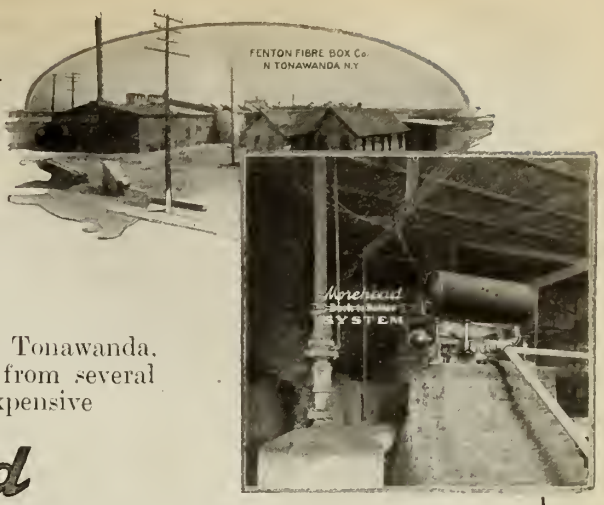
Parker's story is entitled, "Jordan is a Hard Road," and Hendryx's, "The Gun Brand." They are rousing stories told by masters of the craft of writing and story-telling.

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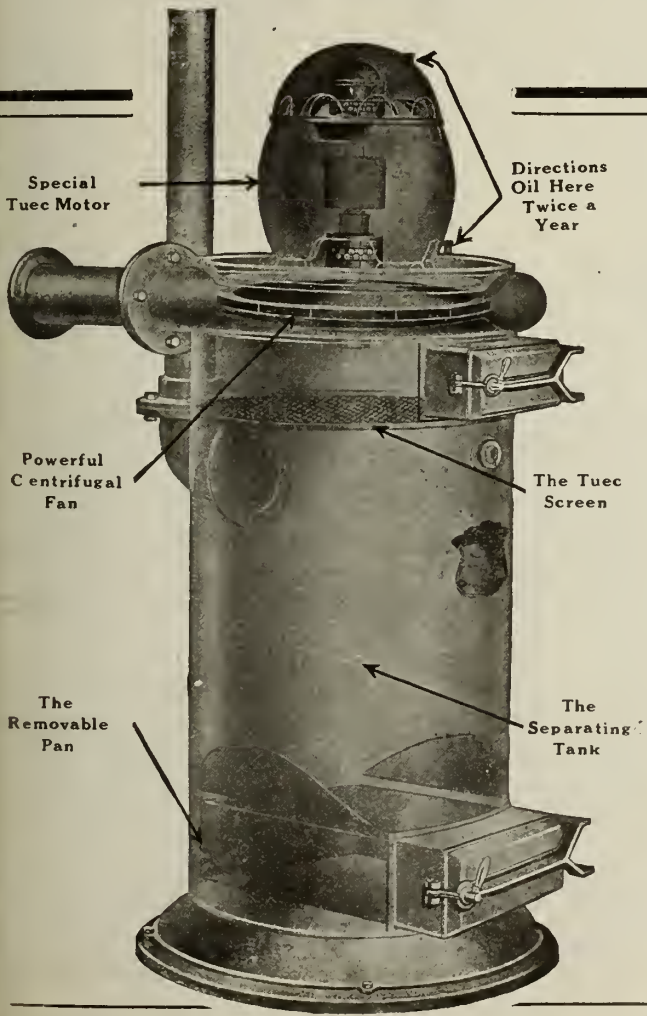
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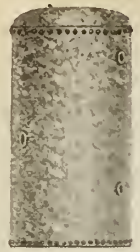
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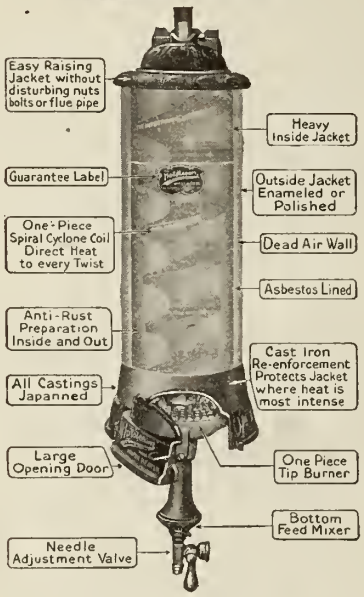
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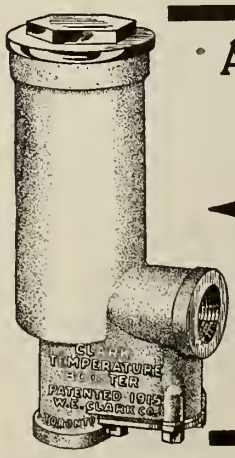
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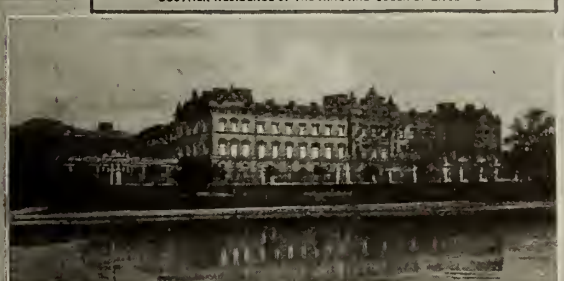
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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, MAY 1, 1917 No. 9

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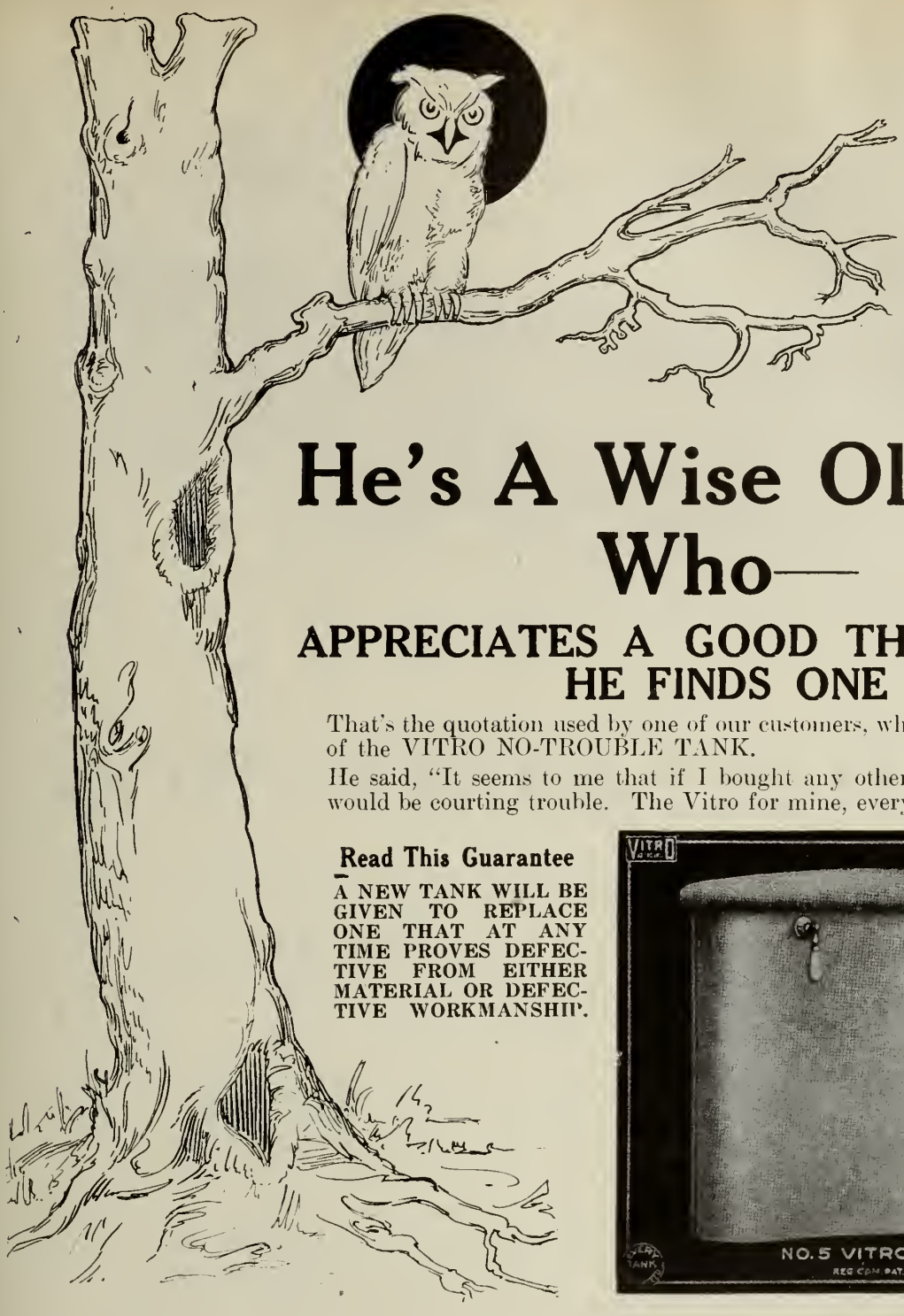
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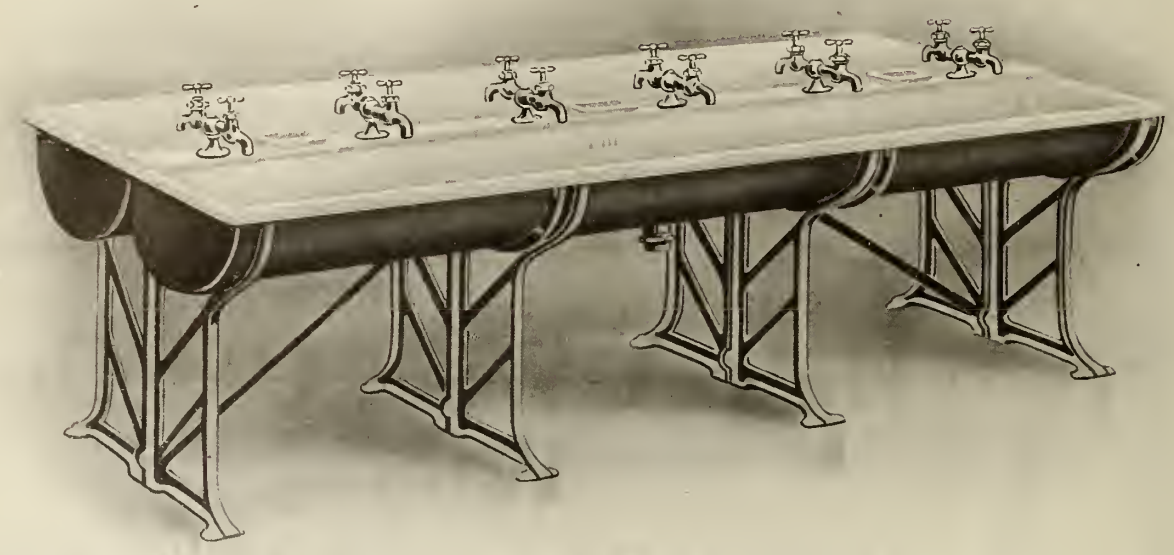
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THE SANITARY ENGINEER

VOL. XI MAY 1, 1917 No. 9

Twentieth Century Heating

One of the Most Important Problems in Building Equipment These Days is That of Heating—Thousands of Dollars Wasted Every Year in Fuel and in Health by Improperly Heated Buildings—Some Splendid Talking Points for Heating Engineers.

By C. A. Dunham.

FOR the enlightment of those who are still entertaining the belief that the furnace, the hot water system, or the steam heating system must be adopted for the home or apartment house, another article is published here that explains the vapor system, combined with advice to the builder and the heating engineer who wishes to keep in perfect step with the progress of the times.

There is probably no one thing with which the builder has to deal which contributes more problems than that of heating the building he constructs. Heating has been a subject of such importance that specialists have devoted years of study to it in an effort to devise ways and means of securing a better and more satisfactory heating system for the home than hot water and steam has proved to be.

The research work which had to be entered into before anything worth while could be produced, naturally led the student to an investigation of the causes for past heating system troubles, and oftentimes, failures, as viewed in the light of the man who had to furnish the fuel and who was inconvenienced by reason of insufficient heat. The practice of the past in asking for bids for a heating system, which the specifications stated were for a heating plant capable of warming the building to certain temperatures with outside minimum temperatures named, is responsible for more of the difficulties than any other thing, and it is to call this to the attention of the architect and the builder that prompts me to emphasize the fact that a specification requiring the contractor to install the system to heat the building to certain temperatures is a dangerous plan to follow.

For instance, good practice demands that the boiler shall be large enough and have sufficient capacity to furnish either hot water or steam in quantities sufficient to heat the building, with one firing or stoking, in each eight hours, during the coldest weather. But, a contractor who is asked to bid with other contractors, knows that good practice is not always followed when such open specifications permit a digression, and in order to stand any show of securing the contract he feels obliged to depart from good practice and install a smaller boiler, which will heat the building, but requires more constant firing or stoking to get the results.

Another prolific source of trouble, due to the same indefinite specification, applies to the matter of radiation, for it is a well known fact that a building may be heated with a smaller number of square feet of heating surface by forcing the temperature of the water or raising the pressure of steam beyond that which good practice permits, and this is often done, and still the heating contractor has technically carried out what he has agreed to do, though it may prove far from satisfactory to the party occupying the building.

The success of any heating plant must start with the building itself. The architect and builder must take the responsibility of preparing the ground work so that when the heating contractor installs the heating in accordance with good practice, there will be nothing standing in the way of getting ideal results.

For instance, the architect and builder must recognize that a large, straight flue, preferably round on the outside and of ample capacity, is very necessary to any heating system. For, without proper regard to the construction and size of the flue, it would make but little difference as to what kind of a system was adopted and installed, for there is no system on the market to-day, using coal as a fuel, that can produce proper results when an error has been committed in the design or size of the flue carrying away the gases of combustion.

It is due the heating contractor to state that many times he has received the blame for the poor working of a heating system, when it was clearly the fault of the architect and builder in not providing him with a suitable chimney. Chimneys should invariably extend above the peak of the roof of the building itself or any other buildings that may be close by. No offsets should ever be permitted, and a separate flue should be provided for auxiliary heaters, kitchen ranges, etc., independent of the heating boiler flue.

Another thing which the architect and builder should look out for is to see that plenty of head room is provided for in excavating for the cellar or basement. There should be at least eight feet between the bottom of the joists below the floor, according to the size of the building. It is not a difficult matter, nor does it represent very much expense, when rigging the cellar or basement and laying the foundation, to provide a furnace room with its floor low enough to secure this clearing space, which will provide a good grade to the supply pipes which convey the heat to the riser pipes leading to the radiators in each room.

All of the above precautions are necessary for a Vapor System as well as for a steam or hot water system, and what I have desired to bring out, is the fact that a defective steam or hot water system, due to causes given in the foregoing, will not be corrected, and perhaps but little benefited, by the adoption of a Vapor System. But I am endeavoring to make it plain that a Vapor System of the right kind, properly installed, has many advantages over either a hot water or steam system which has been properly installed, though the vapor system is not unlike, in many respects, a plain two pipe steam heating system. It requires, as does any steam heating system, a reputable boiler of proper size which supplies steam at low pressures through steam mains that are uniformly graded, leading away from the boiler and which supply the vapor to the riser pipes connected with the radiators.

From the radiators there is an independent system of return piping which

carries the condensation back to the boiler.

The real difference between an ordinary steam heating system and a vapor heating system rests not only in the difference between steam and vapor pressure, but other analogous features which make it possible to regulate the heat as required in each room with the vapor system, whereas a steam system permits of only the extreme limitations of full heat or no heat.

A vapor system, to be successful, must have a pressure controlling apparatus in the boiler room which will positively maintain a fixed vapor pressure on the boiler, measured in ounces. This is found to be accomplished best by a damper controlling apparatus through an independent source of power other than the vapor pressure itself. The most approved method is by electrical contact through a simple device which operates the dampers by means of the electric current with which the house or building is lighted. Such a construction gives quick and positive action and affords the same power to operate the dampers with three ounces as with twelve ounces.

The most approved method of circulating vapor through radiators is with the feed at the top and the vapor admitted in quantities as required by a graduated inlet valve that may be regulated according to the requirements of each individual room.

No air valves are required on the radiators. These openings, where sizzling, spluttering air valves are usually placed are plugged up tightly, and thermostatic traps are placed at the lowest return end of each radiator connected with the return pipe system, above referred to.

These thermostatic traps are a very important adjunct in vapor heating, since they remain open to allow the air and the water to pass into this return pipe where provision is made for the escape of the air and the passage of the condensed vapor back to the boiler from which it came. The thermostatic trap performs its function, after the air and water have passed, by automatically closing down the hole so that no vapor can escape from the radiator into the return piping.

Builders and owners alike, have always had a dread of the frozen radiator, for such has caused great damages, but the present day vapor system sets the builder and owner at perfect ease on this point. Where it is installed, the radiators can be turned off, the windows thrown open, and no damage will result from freezing, even in the coldest climates.

It is well, however, to call attention to the fact that with the facilities of so easily regulating the heat by a simple movement of the handle on the inlet valve, there is but little, if any, tendency on the part of the occupants to raise windows when the room becomes too warm, because to raise a window is more laborious than to close off the heat with a modern vapor heating system.

In closing this article, I wish to again call attention to the fact that the heating of buildings has progressed. Twentieth Century methods are simple, economical, and provide heat just where heat is wanted.

Farmers in Want of City Conveniences

The Cost is Not Exhorbitant—While the First Cost Appears High, It is Really Less Than in a City—The Best is the Cheapest and Cuts Out Unnecessary Repairs.

BY ONE OF US.

IN the April 15 issue, we discussed the matter of first cost of a complete sanitary and heating equipment. The everyday want was taken up, even to cooking by gas as well.

In this issue we purpose showing how the figures quoted could be considerably reduced, but as a matter of good judgment we thought it best to show in our first article the very outside cost.

Let us for the moment assume then that our farmer friend cannot see his way clear to install a hot water heating system, or a gas making appliance. Let us also assume that there is electric current available. The figures would then read as follows:—

Bathroom and kitchen outfit, comprising bath, w.c., wash basin, with sink and laundry tubs, hot and cold water at every fixture, approximately	$350.00
Pneumatic water system, electric driven	200.00
Warm air furnace (the best)	200.00
	$750.00

And look at the service such an equipment would render on a farm. The following story comes from a farmer and describes in a general way his sanitary and heating equipment. Some time ago the writer took a trip out some miles from the city to see this equipment and was most agreeably surprised at the conveniences to be found.

While waiting around for the proprietor, the writer did a little exploring on his own account. First of all, in the horse stables, he found a number of faucets conveniently placed to water the horses. The same conditions were found in the cow byres. A large windmill served for pumping the water. A unique arrangement was found controlling the water as it was pumped.

A large pneumatic tank was fitted to the windmill and this tank was given preference to the cisterns. The control operates in something like the following manner: Assuming that the cistern is empty, as well as the pneumatic tank, and the windmill is set in motion, the first pumps water into the pneumatic tank, compressing the air and pumping a pre-determined quantity of water into it. As soon as the desired amount of water is procured, the pressure in the tank operates the controlling device so that a three-way valve is turned which closes the water supply line to the pneumatic tank and opens a supply to the cistern. As soon as the pressure and water level is lowered by using, this three-way valve is again reversed, and the water is pumped into the tank.

Suppose the cistern also gets filled, this device then stops the windmill, which can be started again by either the water in the cistern lowering or the pressure in the pneumatic tank being reduced.

The above is the hard water supply system.

There is also a soft water pneumatic system, which is operated by hand at present, the layout and location of the two equipments is shown in one of the plans.

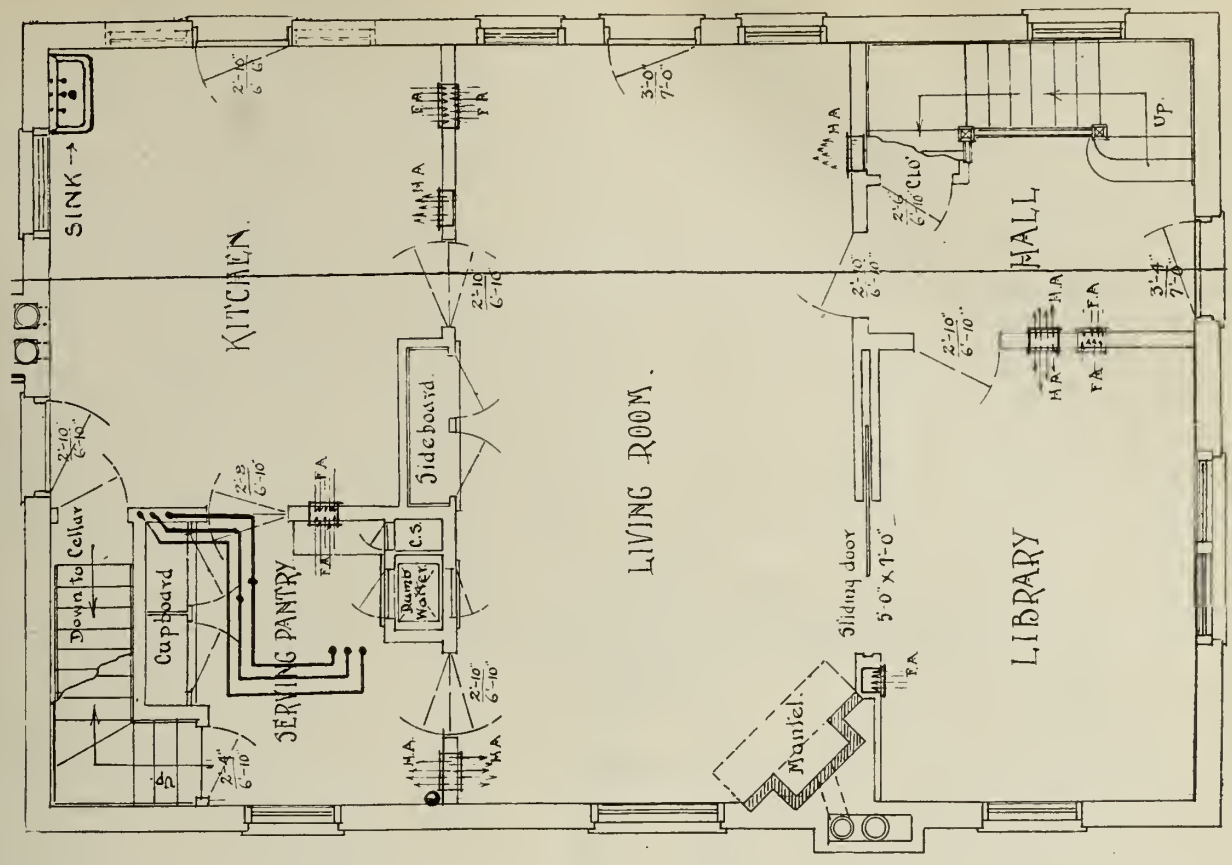
The house is situated upon rising ground, partly made by thowing out the earth from the basement excavation. A septic tank and field tile sewage disposal system is also in operation.

Describing the plumbing system, it may be mentioned that the hard water goes to the w.c. and a tap is fitted over the bath. The bath and wash basin is supplied with hot and cold soft water. The range boiler is situated in the bathroom and serves to keep it heated.

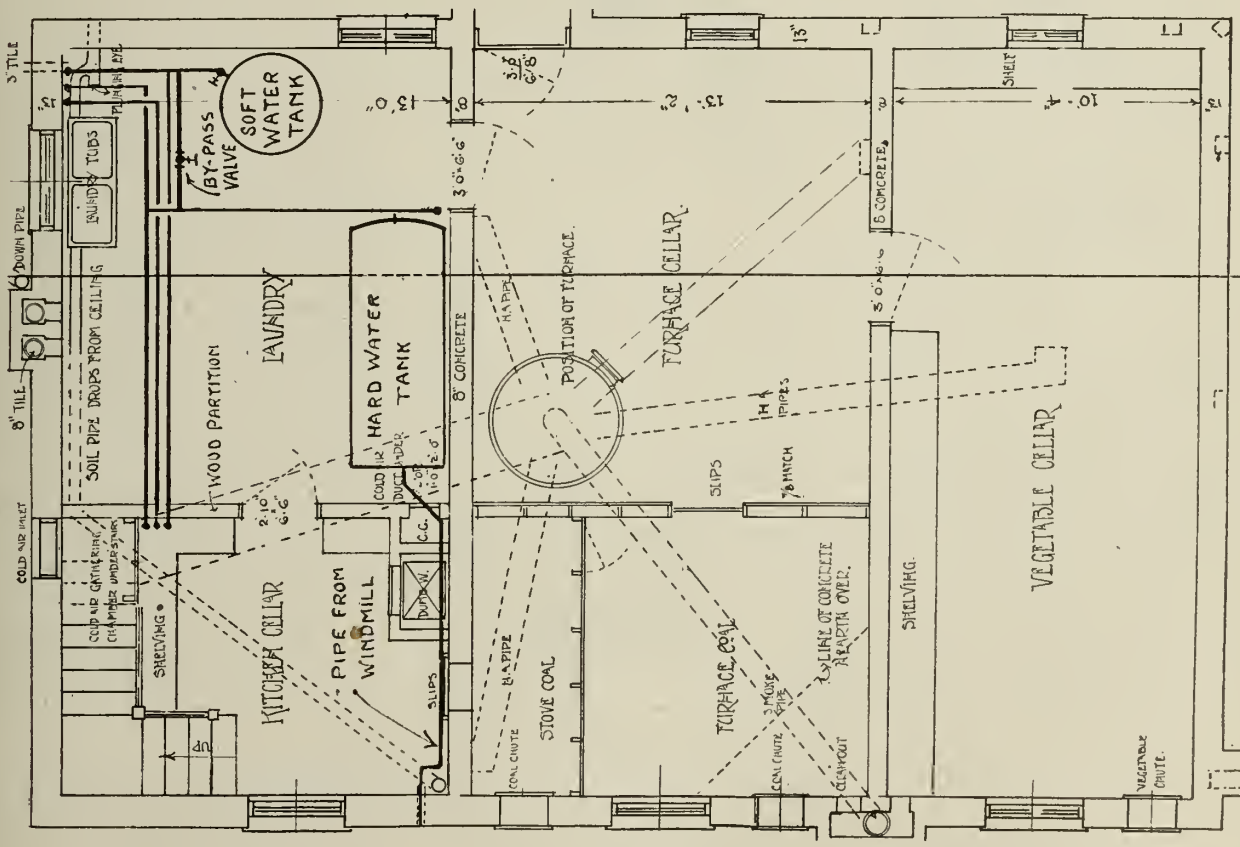
In the kitchen the sink is also furnished with hard water and soft hot and cold water.

In the basement the laundry is fitted with double laundry tubs, the left hand with hot and cold soft water, the right hand tub with hard water for rinsing. The basement is drained in the usual manner and all the fixtures are properly trapped and vented.

All the water piping is galvanized and properly installed so as to drain. It might also be stated that this job was installed by day labor, the proprietor preferring to take no chances of having a skimped job.



Heavy lines show water pipes. Note hot and cold air ducts in each room.



Showing basement plan—heavy lines are water piping and pneumatic tanks.

Heating System

The house is heated in a proper, scientific manner, which means that it is both heated and ventilated. All the warm air registers with the exception of one in the hall, are situated about 6 feet from the floor; the cold air ducts are all in the baseboards, going into the floor space which has circulation in all directions, owing to the fact that 2 x 2 strips are laid over the joists.

Each floor space connects with the ventilating flue in the main chimney, which flue is composed of the space between the soil pipe and vent pipe stock and the brick wall of the chimney.

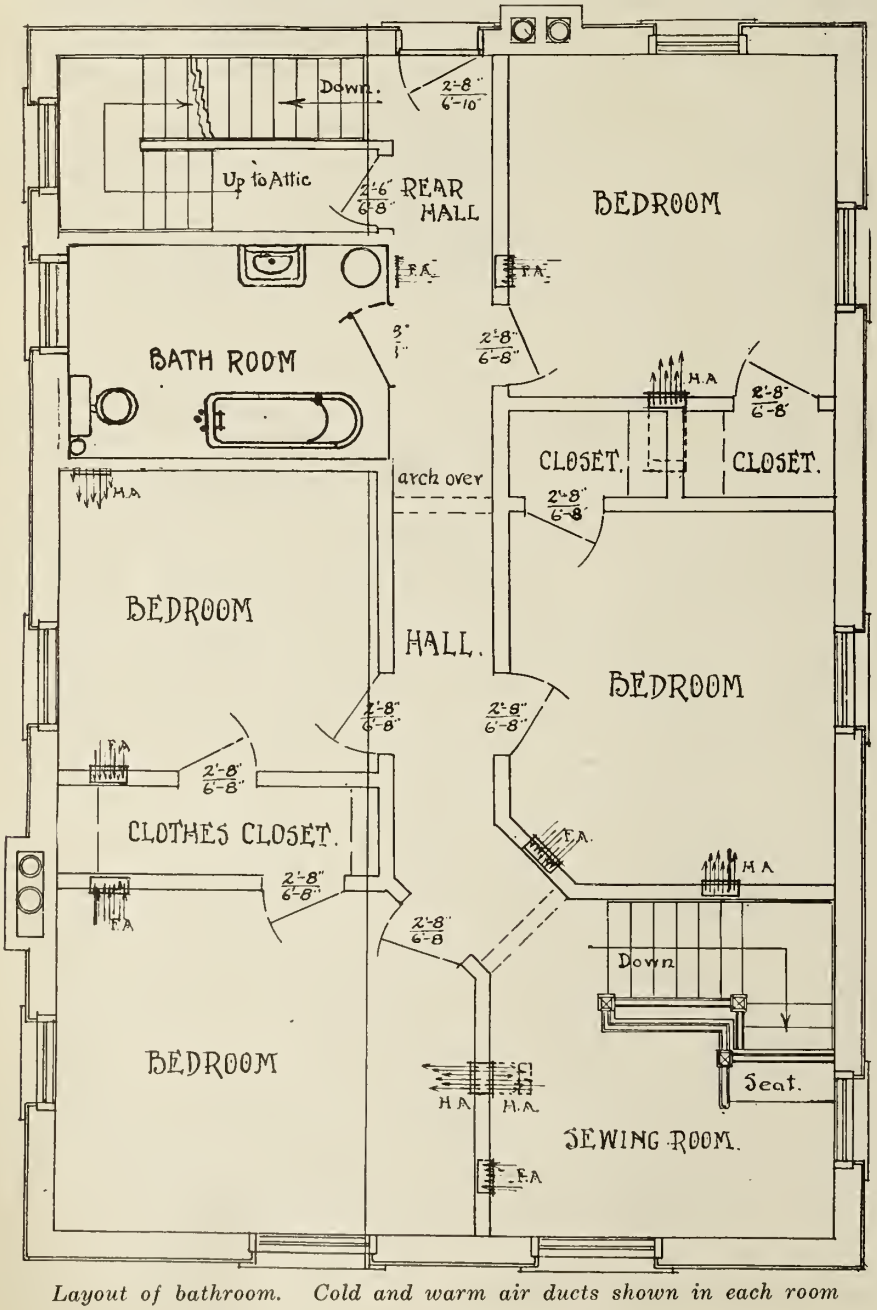
Upon asking our farmer friend what led him to build such a house, and equip it in so modern a manner, he replied:

"In the first place single help was hard to get, and the work round the house imposed too great a burden upon my wife, hence we decided to make arrangements for accommodating a married man. This involved building a house for such help, or vacating the house we lived in and building another for ourselves. We carried out the latter course.

"Having once decided, it seemed foolish not to build for the future, and have all the conveniences possible within reasonable cost. We hope to have the Hydro electric current in the house in a few months and will use it for lighting, power and in part for cooking."

Said he: "I do not know how we would have got along without the sanitary and heating conveniences. They have proved of great benefit. My wife has been alone a good part of the time, and if it had not been for the household conveniences we should have been almost, if not quite, stuck.

"I have no hesitation in saying that our investment in that direction has paid for itself several times already, and we are looking forward to the time when electricity will be available, thus providing still greater comfort and safety."



Layout of bathroom. Cold and warm air ducts shown in each room

Such testimony from a man who has actually experienced the benefits of sanitary and heating appliances on a farm should prove valuable to every sanitary and heating engineer, by way of furnishing talking points. Of course we ourselves know no other investment on a farm can possibly bring as great a benefit in time saving, cutting down cost of help and increasing the efficiency of the hands on a farm, not to mention the element of safety that is acquired. But actual experience is the most valuable, and if sanitary and heating engineers want to help the country in the best possible way, it can be done by showing the farmer how he can best and most economically increase his farm products. Whether it be cattle raising, growing garden products, or wheat.

It is a well known fact that where farmers have failed, or even where they are not making the success they should, it is because they have lacked the necessary equipment, agricultural or domestic, or both.

TORONTO'S HEALTH OFFICER WOULD TEAR DOWN 3,000 HOUSES

In reporting upon housing conditions in Toronto to the Local Board of Health, recently, Dr. Hastings, Medical Officer of Health, recommended that a conference be held between the Board and the Toronto Housing Company. The report was made as a result of a suggestion from the Local Council of Women that something should be done to replace 3,000 houses in the city.

Dr. Hastings pointed out that there never was a time when there was so much per capita wealth in Canada as there is at present. From figures quoted by an authority in the United States, it was shown that the wealth of Canada, represented by bank deposits, was $92.50 for each unit of population. This amount is above the per capita wealth of any other nation in the world. Before the war the per capita wealth of Canada, in bank deposits, was $55.50.

Ald. Hiltz said there was no doubt that there is a scarcity of houses in Toronto, and Ald. Maguire offered the opinion that when the manufacturing of munitions of war ceased there would be many people leave the city. He said many people had come into the city to live because members of their families were working in munition factories.

"I don't think they will leave the city when they are through manufacturing munitions," said Dr. Hastings.

The Board agreed that there was need for more houses and recommended to the Board of Control that a conference be held with the Toronto Housing Company to discuss the whole housing problem.

The above item would lead members of the trade to think that business should be pretty good from now on. It would be well to keep such news in mind and not be tempted to take work at a price that will not show a fair working margin of profit.

An Address on Bookkeeping

Given Before the Toronto Society of Sanitary and Heating Engineers—Some Splendid Examples, Simple Yet Necessary, to the Success of all Businesses.

By D. MacLulich, accountant, Keiths, Limited, Toronto.

THE survival of the fittest is one of Nature's great laws and applies in the business world as much as in the world of Nature. The man who goes along blindly from day to day hoping that at the end of the year his business will come out alright and show if not a large yet a fair profit is a weakling who is bound to go to the wall sooner or later and make room for his competitor who is progressive and up-to-date and knows not only what his actual profit or loss may be each month but knows also the why and every element that enters into the final result. Knowledge is power and such a man is master of his business. However prosperous a business may appear to be, however long established without such system and organization, it is like a tree—fair to all outward appearance but rotten at the core and sooner or later will be uprooted.

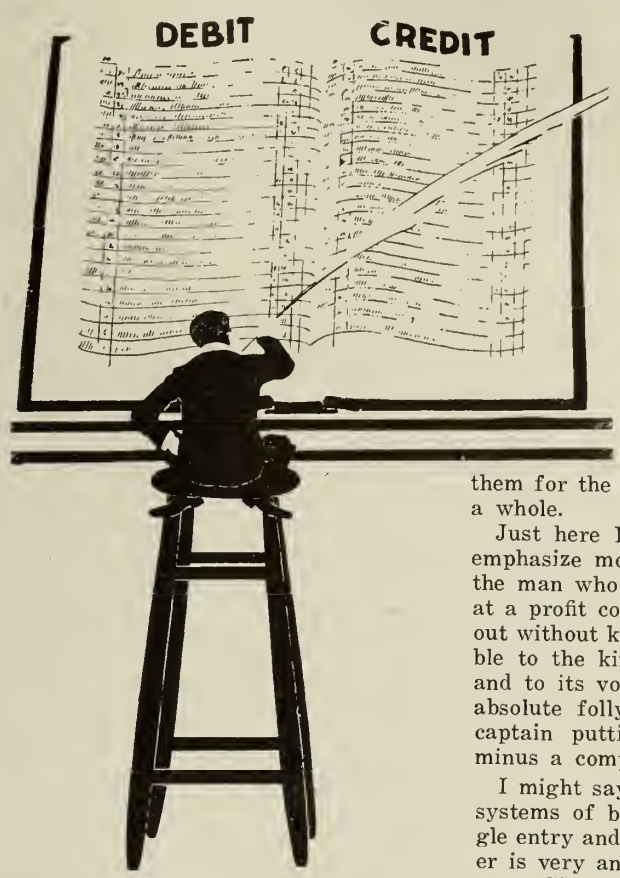
In speaking to-night of plumbing accounting, I think I should start out with a word in season to perhaps only a very small proportion of the members of our Association, and that is to impress upon such the absolute necessity of keeping books of accounts; and I would further say that while any books are better than none yet there is no reason why you should not have your account books framed in such form that they will let you yourself readily into the inner secrets of your business without you having to call in an expert accountant to dissect them and give to what was previously a mere maze of figures an intelligent interpretation which will allow you the better to direct and control your future operations.

Many a man thinks he is making profits until at the end of a year or even a longer period he finds himself up against the stone wall of failure when a proper system of accounting would have kept his hand so to speak on the pulse of his business and he could have then speeded it up here or slowed it down there or changed its course before it was too late.

To reduce the system of book-keeping down to its simpest form suitable for a small business where a book-keeper is not employed one should have five books:

1. Journal
2. Cash Book.
3. Sales Day Book.
4. Purchase Day Book.
5. Ledger.

I will now proceed to illustrate and explain the uses of these books in detail but I wish it to be distinctly understood that, while these books are, I consider, suitable to the smaller class business doing a turnover not exceeding $15,000 per annum or thereabouts, they would be entirely unsuitable, in the simple form to which I intend to limit them, to the larger shops. Notwithstanding this, however, they form the basis of all bookkeeping and the largest manufacturing businesses using the most elaborate system of account-keeping are dependent on such books in one form or another. That is to say, the books described here form the basis of all correct accounting but can be elaborated a hundredfold to suit the exigencies of any particular business without the fundamentals being in any way altered or set aside.



A few minutes' bookkeeping every day will result in many a sunshiny day financially.

You will understand I am sure that it would be impossible for me in speaking to members of our Association representing both large and small businesses to cover the ground thoroughly in one address to be of interest to both classes. I have, therefore, to confine myself to one or the other and in choosing to address myself to-night more particularly to the proprietor of the moderate-sized business I do so with the one desire that this address, if there should be any merit in it, may be of use to the largest number and to those who, being primarily mechanics, are in most need of a helping hand along these lines. Also I consider this class the most important as it represents the backbone of the plumbing and heating trade as a whole, while the larger shops if necessary employ competent accountants to look after the book-keeping end of their business. Those of you who find nothing of interest or helpfulness in my remarks I must ask to extend to me your charity and share with me the spirit in which I make them for the good of our Association as a whole.

Just here I would like to repeat and emphasize most strongly my belief that the man who thinks to run his business at a profit consistently year in and year out without keeping a set of books suitable to the kind of business he is doing and to its volume is guilty of the most absolute folly and is no better than a captain putting his vessel out to sea minus a compass.

I might say briefly that there are two systems of book-keeping styled the single entry and the double entry, the former is very ancient, the latter more modern. Single entry is very seldom used nowadays, though it is still suitable for certain very limited classes of business. With this system, however, it is difficult to detect errors and impossible to compile a Profit and Loss account from the books themselves.

Double Entry so called is really no more difficult to keep, provides an absolute check on the mechanical accuracy of the books, allows a profit and loss account to be compiled and may be adapted to all conditions from the simplest to the most complex. I am, therefore, going to outline a double entry set of books in a very simple form, but if anyone here is not already keeping some form of double entry books and wishes to start I might say that while you will find the examples here illustrated work satisfactorily you do not necessarily have to use these particular forms to attain good results, but if you do use them for a start then as time goes on you will discover improvements suitable to your own particular business without, of course, in any way departing from the basic principles.

The principle of Double Entry is that every transaction has a twofold character. One person or account imparts a benefit (it may be goods or cash or some

other thing), another person or account receives that benefit.

The person or account imparting the benefit is the creditor, while the person or account receiving the benefit is the debtor.

Thus, if John Jones pays me $20.00 he imparts a benefit and is my creditor for that amount and I show it on my books by placing that amount to the credit side or right hand side of John Jones account in my ledger. My cash account received the benefit and, therefore, I place the sum of $20.00 to the debit side of my cash account. Every transaction must be considered apart as a complete transaction in itself. In considering the above example, the fact that John Jones already owed me $20.00 and therefore strictly speaking is not my creditor has no bearing on the particular entry showing he paid me $20.00. If I want to ascertain the state of affairs between myself and John Jones, I turn to his ledger account and there I see that while he paid me $20.00 and his account was so credited he previously was in my debt to the extent of $20.00 and that now his account is squared. This simple principle can be applied to every book-keeping entry and hence the name "double entry." Furthermore, it follows that each transaction being entered twice on the books, once on the debit side and once on the credit side, the total of all the debit eneries in your books must equal the total of all the credit entries. When we balance the books to prove their correctness and to see that no errors have crept in we do not necessarily go to the trouble of adding all the debit entries together and comparing them with the total of all the credit entries. We merely take off a list of the debit balances of each outstanding account and a list of the credit balances of such accounts as show a balance on their credit side and a total of the two lists must necessarily agree, thus proving the accuracy of the work.

The Journal, cash book, sales day book, and purchase day book are styled books of original entry because all entries before finding their way finally into the ledger are first recorded in these books and from them are transferred or as we term it "Posted" to the ledger, which contains all the accounts of the business in a classified and easily get-at-able form. Originally there was only one book of original entry, the Journal, in which all transactions of whatever kind were recorded chronologically day by day. This one book, therefore, contained records of cash received and paid, sales, purchases of material, credits and adjustments, etc., which were then transferred to their respective accounts in the ledger but in course of time this book became so cumbersome that all cash entries were recorded in a separate book called the "cash book," this was followed by segregating all sales and entering them in a book to themselves styled the "sales day book" and similarly the material purchases were segregated into a "purchase day book" leaving to the journal the task of recording all such entries as do not obviously fall into one of the three classes mentioned above. This simplified book-keeping immensely as a great mass of unwieldy detail entries were eliminated and in their place we are able to deal with monthly totals of the various classes. From this brief explanation you will understand that the cash book, sales and purchase books are really parts of the original journal kept in separate book form for convenience.

(Continued in Next Issue)

Regarding the Installation of Pneumatic Water Systems

Many Readers Are Being Confronted With Problems Relating to the Proper Installation of Pneumatic Water Systems

By "Troubles Man."

WE propose to start a new series of articles which will treat with a number of troubles relative to the installation of pneumatic water systems, and we would very much like to have our readers send in any problems that they may from time to time be confronted with.

We shall first of all treat this subject in a general way and as simply as possible so that it will be quickly understood by those whose lot it has not been to receive a liberal education.

There will be no highly technical phraseology indulged in, and simple facts will be given that can be relied upon, practices that have been proved by experience only, will be given.

Just to illustrate what we mean by this we are publishing herewith a list of common troubles that have been brought to our notice and which no doubt many have been "up against." These subjects will not be discussed in this article but a start will be made in the May 15 issue, in the order shown herewith.

No. 1.

A pitcher pump situated in a kitchen is connected to the same suction pipe line as an electrically driven pump, the latter did not work well.

No. 2.

A pneumatic tank appeared to be leaking, at least it did not maintain the air. Water could not be got through one of the faucets, a pipe had been taken off top of tank above the high water line.

No. 3.

An electric switch would not operate. The pipe to the diaphragm had not been connected to the tank.

No. 4.

An electrically driven pump was installed in a basement near to the pneumatic tank.

Pump would deliver water for about two minutes, then water would cease to come. Pump lost its priming so the sanitary engineer said.

The above are a few cases that have come to our notice and we will show how these jobs were installed, and why they did not give satisfaction.

NEW MATERIAL WHICH WILL TAKE THE PLACE OF COAL

An American mining engineer is on a visit to England with an invention for using nitrogen as an energy-producer in place of coal, at a fraction of the cost. He is offering it, in the first place, to the British Government.

In an interview he pointed out that there are in the atmosphere nearly four thousand billion tons of nitrogen available for use in the new power, and unlike the use of hydro-carbon fuels, which are destroyed, his method of using nitro-power converts the fuel back into its elemental state.

"It can be used," he said, "for every purpose for which coal and crude oil are now used, even to smelting. With the apparatus I have invented one ton of nitro-energy is equivalent to thirteen hundred tons of coal, and it is safer than petrol. From it electricity can be made for a fiftieth of the present cost, and five or six generating stations with trunk lines radiating to all parts of the country, will turn every wheel in the kingdom, light and heat the homes and do the cooking.

"A battleship could keep the seas for a year without a new supply of fuel."

ONLY PROFIT COUNTS

Whenever you are tempted to put in a low price, remember it is the net profit that counts, and not the volume of business you do.

If you make no profit on jobs you do, you are not making money, no matter how much business you are doing.

LOVE YOUR WORK

The formula for the successful business man is the same as for all earthly endeavors. Love your business and the work which you are here to perform; be endowed with an imagination that can build an ideal for you to work towards and then be blest with a continuity of purpose that can and will make your dreams come true.—*The Business Builder.*

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MAY 1, 1917

A SPLENDID ADDRESS

IN this issue the first of a series of articles appears on another page by D. MacLulick, accountant at Keith's, Limited, Toronto. Mr. MacLulick delivered the substance of these articles in an address to the Toronto Society of Sanitary and Heating Engineers some time ago, and it is now published in THE SANITARY ENGINEER for the benefit of every reader. The next article will be illustrated with suggested types of ruling for the various books referred to, and the whole series will prove very beneficial to every one who has not so far given the subject of practical bookkeeping much thought. As Mr. MacLulick states, "There is bound to be a certain element of danger existing where poor bookkeeping prevails. It is the true key to a business and a source of power. However prosperous a business may appear to be, however long established, without a good system of bookkeeping and a practical working organization, such a business is like a beautiful tree, fair to look upon, but rotten at the core, and because of its unfruitfulness, must sooner or later be uprooted."

THE GOLDEN RULE IN BUSINESS

WE question very much if there is in the business world a more maligned class than that of sanitary and heating engineers.

We know that as a whole there is no class of business men in existence that has given to the world as great a service as have our ancestors, the plumbers and workers in lead.

At one time in history the world did begin to look upon plumbers as a craft to be respected, but we became too much of a commercial commodity. Jerry builders and architects got the upper hand of plumbers, and began to dictate as to what should or should not be put into a building. We do not altogether blame these men except that they were aware of the fact that plumbers were and always will be mechanics first and business men afterwards.

The sanitary and heating engineer is becoming a recognized factor in the building trade; he does not want to be called in to make repairs which he knows should not require to be made. He does not want to put washers on taps, clear waste pipes, but rather instal in the first place such goods as will not call for repairs as often as in days gone by, or clear waste pipes that, if properly installed, would very seldom become choked.

He wishes to put into practice the Golden Rule: instal such goods as his practical experience has proved to be the best, and to lay out his work in a proper manner, and in that way become more respected than in days gone by.

We have heard recently of men who champion certain goods for particular reasons, goods which we know are not of the fit or proper kind. These men know, too, that they are deceiving the public as well as themselves. We, and they, too, know that that portion of their business has outlived its usefulness and should therefore not be allowed to exist.

We are proud to know that readers of THE SANITARY ENGINEER took such an interest in condemning clay tile pipe for house drains as they did. Out of 150 letters sent out, the larger portion were replied to, and not one favored clay tile pipe.

These men have had experiences which proved to them which pipe was the best. They are putting into practice the Golden Rule in business, in spite of the fact that the general public look with suspicious eyes at them. We have found cases where men have refused and lost good business because an architect has specified clay tile pipe for a house drain.

And why? Because the trade has been too long the goat for inexperienced men. To-day sanitary and heating engineers are out to instal such goods as are best fitted for the work these goods will be called upon to perform. The work of the sanitary and heating engineer is to keep a people healthy, and by so doing, we shall in a very short time be looked upon as men who put into practice the Golden Rule.

Straight Talks to the Craft

Being the Second Article Dealing With the Proceedings of the Last Four National Conventions, Provincial as Well as Local Convention Proceedings Will Also be Commented Upon.

By One of Us.

Article II.

THE next items of business taken up at the eighteenth annual convention were in connection with certain matters relative to purely constitutional matters, and need not be referred to in these articles, as they had no direct bearing upon affairs that would interest most of the trade.

One thing however that was to some extent touched upon which is without doubt a weak link in many a sanitary engineer's business was the answering of correspondence promptly.

Mr. Marr, Calgary, expressed himself very strongly when he said "I could not continue the style of correspondence I had this year. It gets on my nerves when I write a lot of letters and receive no replies." Mr. Marr declared that he spent considerable valuable time in writing letters to members of the association, and received very few answers.

This of course we all know is typical of most men of a mechanical turn of mind, but it does not excuse such conduct.

It would be a splendid thing if every association would have a clause inserted in their rules of membership, that a monthly letter be sent by every member to the president, or vice-president of his association.

There is no reason in the world why some few minutes should not be devoted to this matter of writing at least a monthly letter, and to cultivate the habit would prove a boon to every member of the craft. Some reader may ask, "What would the letter require to be about? Sometimes there is nothing to write about." To such a query we would suggest that if a member is anxious to see his business or profession keep step with this world's progress, he will very easily find something of interest to write about.

Mr. Marr, the secretary then read the president's report, the president E. J. Young, Calgary, being unable to be present. The report contained some very interesting suggestions, but to date we doubt if there has been very much done with regard to any of them. For instance a uniform plumbing code for the whole of the Dominion was suggested, and as far as can be learned, nothing in this connection has been done.

Since that time however many towns and cities have re-modelled their plumbing by-laws. The Ontario Society has compiled a provincial by-law but no attempt that we know of has been made to get an exchange of ideas, between the various locals.

For instance, just recently several new plumbing by-laws have been put into force, that are not half as practical as they might have been had the members of the Canadian Society been in a position to help these towns in the remodelling of their codes.

One town appointed recently a building contractor as plumbing inspector, who, until he had been on the job a while was thoroughly convinced that the position required a practical sanitary engineer to fill it properly.

The question now is, why not make it known that the association is willing to assist in these matters. Conduct a service department, and have some member always on the look-out for information that would let the president know when a by-law is to be remodelled, or a plumbing inspector to be appointed. The monthly letter referred to would help out in this matter, and make it interesting for all concerned.

Regarding the appointment of a plumbing inspector who is a practical man in the art of plumbing construction, why could the matter not be referred to the provincial health department first for the following reasons?

It is a well known fact that there are many small towns where only one plumber is in business. He is oftener than not a man of limited education along the lines which govern progressive sanitary plumbing construction. His work is very often of a poor character and it is necessary for some one to pay a visit to his town to inspect the work he has done from time to time.

It would be far better to have a practical man as either a provincial or district inspector, than to have the matter in the hands of the local councils etc. These same councils have by law to appoint a M.O.H. and this official must meet with the approval of the Provincial Health Dept. Why not then have the same course followed when appointing a plumbing inspector?

We know this is a big question but not too big, or even too difficult for the Canadian Society to undertake.

The craft must at no distant date be heard, or else sink into obscurity for all time. It is only by keeping in the limelight, that one will ever be taken any notice of "'You must blow your own horn if you wish to be heard" is a true saying, because if you don't, people will not even be aware that you have a horn to blow.

Sanitary and heating engineers have a horn to blow, they have subjects to discuss, and demands to make upon the Provincial, as well as the Dominion Government, demands that concern not only matters of personal interest either. They are matters that are more in the interest and for the benefit of the Canadian people, and someone should be appointed to take these matters up and really do something.

One thing certain is that if the members of the association would send a monthly letter to The SANITARY ENGINEER, it would be given space, and a copy would be mailed to the parties for whom the information was meant.

To date we have received no comment upon our article published in the April 15 issue on page 34. Is there one live member in the whole Association that will co-operate with The SANITARY ENGINEER, to raise a little interest in matters many of which we all know there are that could be discussed and which would prove well worth the time taken up.

(Continued in Next Issue)

The Workshop of Fate

One dreamed a dream, and it seemed he went
Through millions of miles of space,
To a radiant spot where an angel bent
In a wondrous workshop place.

And "What do you make?" he asked in awe,
And the angel answered straight
"The futures of men, by changeless Law,
For this is the Place of Fate."

"Of what do you make such futures, then?"
He asked, and the angel cried
"Of their own deeds are the fates of men
Made up, and of naught beside!

No joy is born of the wrong deed done,
No progress of standing still;
The future by man himself is won
He makes it for good or ill.

"Go back to the earth and receive new birth;
As yet, it is not too late
To fight the good fight and to build aright
The structure of thy Fate!"

SWAPPING DOLLARS.

You are just swapping dollars, and you cannot swap dollars and take money out of your business for improvements or personal use for any great length of time without getting into serious financial trouble sooner or later.

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 22.

NOTES ON THE CONSTRUCTION OF CONCRETE SEWAGE TANKS

AFTER the concrete has been proportioned and mixed, as described in previous articles of this course, it is ready to be placed in position in the floor and walls of the tank. No larger batch of concrete should be mixed than can be used at once as it begins to set almost immediately and in half an hour it begins noticeably to stiffen.

Where placed in large quantities, concrete is a cheap building material, but where thin walls are needed, as in sewage tanks, lumber for forms and labor for making and placing such forms are extra items of expense. In this article, several suggestions as to the making and placing of forms will be made, but this really is a problem which the ingenuity of the practical sanitary engineer can best solve for each particular place. Any available lumber or boards may be used, cutting being avoided where possible.

Before making an excavation or placing forms the thickness of the tank walls must be decided on. For the purposes of this investigation suppose first that each wall stood by itself and that by its own weight it had to withstand the pressure of sewage from the inside of the tank or the pressure of earth from the outside.

Take the case of a tank one side of which has no earth fill against it (see Fig. 1). If the wall by its own weight merely had to support the pressure of sewage (a five foot depth in this case), then taking sewage as weighing the same as water, 62½ pounds, and concrete 150 pounds per cubic foot, the thickness of the bottom of such concrete wall should in all cases be made two-thirds its height (3 ft. 4 in. in the case shown). In theory the shape of such a wall, which as here considered is in effect a dam, could be triangular, as Fig. ABC. In practice, of course, the top of the wall must for other reasons be given a certain thickness, say six inches.

Now suppose a case in which earth is filled to the top of the wall around the side of the tank which is empty. Earth can be taken as weighing about 100 pounds per cubic foot, but all this weight does not, as in the case of water or sewage, press against the side of the tank. For the average case, earth in a pile will safely stand at a slope of about one vertical to one and one-half horizontal while as we all know, water would "flatten" out at once. It follows that while a wall or dam should be in thickness two-thirds its height, so that its weight will safely withstand water pressure, a wall to retain earth need only be three-elevenths of its height in thickness to withstand the average earth pressure. As there is no earth pressure at the very top of the wall and as the pressure increases with the depth of the earth, in theory, the retaining wall could, like a dam, be triangular in section as DEF, but for practical reasons is made at the top at least about 6 inches in thickness.

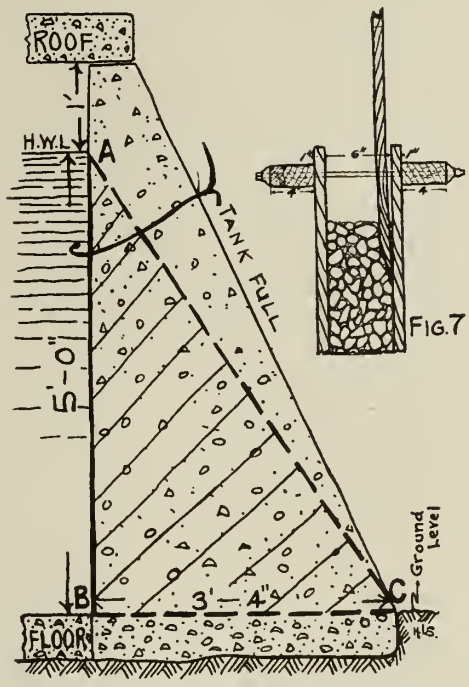


FIG. 1—SHOWING THICKNESS OF WALL IF WEIGHT OF WALL ONLY RESISTED SEWAGE PRESSURE

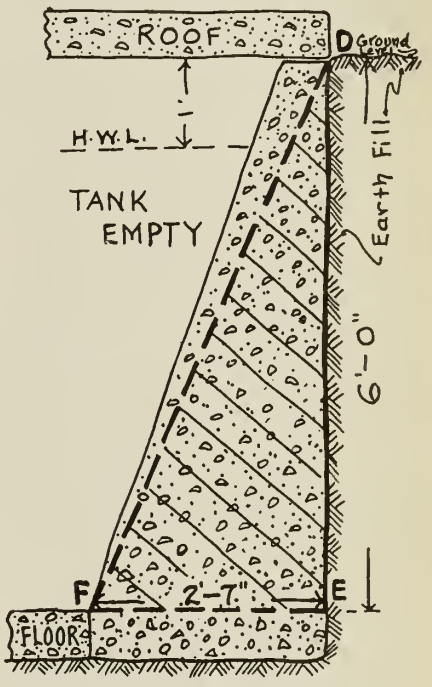


FIG. 3—SHOWING THICKNESS OF WALL IF WEIGHT OF WALL ONLY RESISTED EARTH PRESSURE

Now imagine the tank filled with sewage so that the earth fill presses against the sewage through the wall, and vice versa. For a depth of 5 feet of sewage a wall of 9 inches thickness at the bottom, (3 ft. 4 in. less 2 ft. 7 in.) would be sufficient to withstand the extra pressure of sewage over the earth pressure. If there were only 4 feet of sewage it can be found in a similar way that a wall of 6 inches (2 ft. 8 in. less 2 ft. 2 in.) would suffice. In both cases a thickness of 5 inches at the high water level would withstand the earth pressure.

As a matter of fact, of course, a tank wall receives support from the floor, side walls and partition wall, and sometimes also from the roof. Also ordinarily an excavation is made to receive the tank. The pressure of the firm and compact earth in which the excavation is made is generally less than, and might ordinarily be considered as approximately one-half, that of an earth fill. For these reasons, experience rather than theory is the best guide in determining the thickness of sewage tank walls though a theoretical investigation is of value in showing what the greatest thickness of a wall should be in the most unfavorable conditions.

One authority states that a concrete cellar wall 10 inches thick will withstand a depth of 6 feet of earth, but if the wall is supported at both top and bottom 8 inches thick is sufficient. For the ordinary settling tank containing a depth of sewage of 3 or 4 feet and often even less, 6 inch concrete walls, if carefully made and placed are evidently thick enough.

If the conditions are considered unfavorable or if one wishes to be very much on the safe side, the rules for the thicknesses of walls as outlined in "Practical Methods of Sewage Disposal," by Ogden and Cleveland, might be followed:—

"The top width of the walls should be 8 inches, and the bottom width should be

8 inches plus 1½ inches for each foot of height. Thus, for a wall 6 feet high the bottom width should be 17 inches—the inside face of the wall having a batter of 1½ inches per foot of height. This batter is necessary, when the tank is constructed below the ground surface, to withstand the lateral earth pressure when the tank is empty (compare with Fig. 3). If the tank is to be constructed above the ground surface, the outside wall should be battered and the inside wall made vertical, since the pressure which the wall must withstand is then only from the liquid within the tank (compare with Fig. 1). The partition wall between the settling tank and syphon chamber should be 10 or 12 inches thick at the top depending on its height and should have a batter on both sides."

From a consideration of various small sewage tanks actually installed, it is found that the floors are made from 4 inches to 8 inches thick, with 6 inches as good average practice. The thickness of walls is generally either 6 inches or 8 inches. For tanks in which there is only, say, 3 feet of sewage or less, a 6-inch concrete wall should, as explained, be thick enough. The partition wall can also be made 6 inches in which case there is the advantage that the floor and all walls would have the same thickness of one-half of a foot.

When sewage tanks are, as usual, placed in excavations in the earth, and if the digging is carefully done, the earth walls will make the best outside forms. Fig. 2 shows one method of bracing inside forms for small tanks where the earth alone is used as an outside form. In such cases the excavation is sufficiently wide to allow for the walls and 6 inches deeper than the inside dimension of the tank require to allow for the floor which is first laid. When the forms are placed and concrete tamped, generally in layers of about 6 inches,

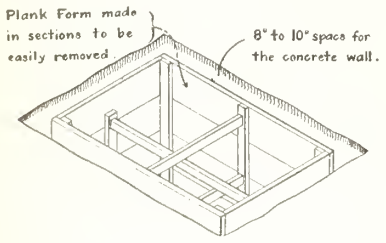


FIG. 2 — BRACED FORM FOR BUILDING THE TANK WALLS.

between the forms and the earth wall. The forms should be wet, and to prevent concrete adhering thereto, may be oiled (linseed, cylinder, etc., oil, but never "coal oil"), or soft soaped.

In order to obtain a desirable smooth face on the concrete a bevelled board similar to that shown in Fig. 7 (made from 1 inch by 4 inch stuff gradually sharpened to a chisel edge at the end) should be worked between the concrete and the inside of the form, being moved up and down and to and fro. The sharpening should be on one side only and in using such a tool the flat side should be placed against the form. This forces stones away from the form, leaving there a coating of mortar which when set makes the inside of the tank smooth and aids in making the tank water tight.

Figures 4 and 5 show how forms may be placed for small single tanks. From these figures the reader may get some suggestions useful for constructing sewage tanks all above ground. In Fig. 4 the dimensions of the tank are 2 feet wide by 8 feet long, but only 1½ feet deep. The walls are made but 3 inches thick though the floor is 6 inches thick. For a tank 3 feet wide and 2½ feet deep, the walls are made 4 inches thick. The tank shown in Fig. 5 is 4 feet square by 6 feet deep.

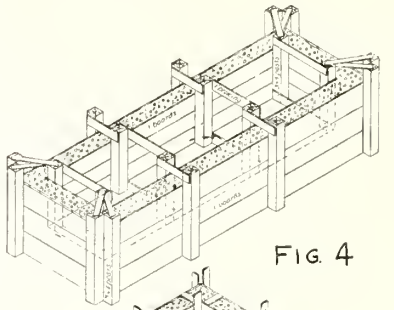


FIG. 4

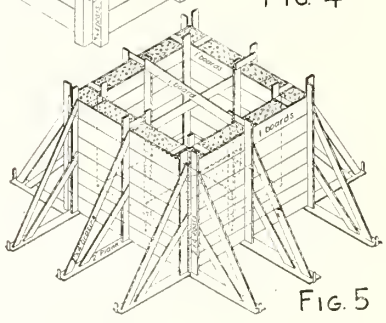


FIG. 5

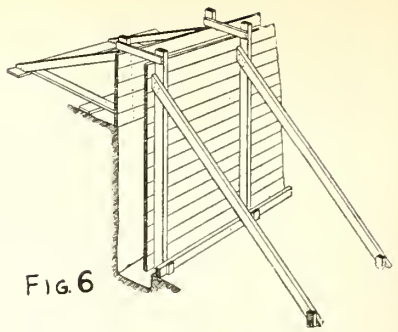


FIG. 6

In Fig. 6 there is shown a wall form for a large tank. This figure also shows how the necessary outside form may be braced when tank walls project above the ground level. It is sometimes arranged that the boarding of the inside form is not carried below the level of the proposed elevation of the floor of the tank. Then, if the excavation for the wall has been carried to a level 6 inches lower than the floor of the tank, the concrete when being placed between the form and earth wall will spread under the bottom of the form better insuring a water tight joint when the floor is subsequently laid against this inside foot of the walls. It will be noted in this case that the walls are to be constructed before the floor while, as explained, the general practice for small tanks is to lay the floor first.

The most difficult part of a concrete tank to construct is probably the roof. A full treatment of roof construction will therefore be taken up in the next article.

(Continued in next issue.)

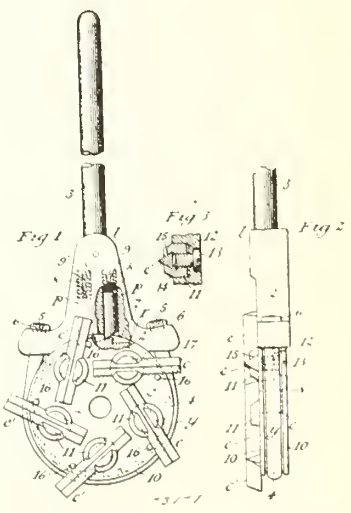
New Canadian Patents

No. 173,177.

The Leavitt Machine Company, assignee of Thomas Birch Williams, both of Orange, Massachusetts, and of Frank Lorenzo Smith, Chicago, Illinois, both in the U.S.A., 14th November, 1916; 6 years. Filed 19th June, 1915. Receipt No. 252,652.

Claim.—1. A tool of the class described comprising a rotary disc cutter having cutting faces at one side thereof and having a centrally located pivot point, a cutter carrier having a bearing for supporting said cutter head at its periphery for rotation, and a feed connection between said cutter head and cutter carrier.

2. A tool of the class described comprising a rotary disc cutter head having cutting faces at one side thereof and having a centrally located pivot point, an actuating lever having a bearing for supporting said cutter head at its periphery for rotation, and a ratchet feed connection between said cutter head and lever.



No. 173,177. Rotary Cutter.

3. A tool of the class described comprising a rotary disc cutter head having cutting faces at one side only thereof,

(Continued on page 30.)

Steam Traps, and How They Operate

Heating Engineers are Often Confronted With Steam Trap Troubles — The Following Article Will Prove Interesting to All—Many Important Questions Answered.

By J. E. Swendeman, Mechanical Expert, American Steam Gauge & Valve Mfg. Company, Boston, Mass.

How to Decide on the Size Steam Trap Required for Any Service

Be sure the trap has sufficient capacity to handle the condensation under its most severe conditions.

Remember that the conditions are changeable, due to varying temperatures and pressures of the apparatus to which the trap is connected.

It must be remembered that the condensation is greatest when the steam line or apparatus has been thoroughly cooled, and that the amount of condensation coming to the trap diminishes as the steam line or apparatus reaches its maximum temperature.

There are cases where steam traps have been installed on apparatus in the summer months, and have successfully handled the condensation during that period, but with the climatic change to lower temperatures the condensation materially increased and the traps were unable to handle same under the changed conditions. Such possibilities should be considered when selecting steam traps. This is another good illustration of the necessity of following the size of valve orifice, and not the size of pipe connection, when buying steam traps.

You cannot get into trouble by the trap being too large; but a trap unable to meet these conditions may result in serious damage, especially when connected to a steam engine separator. If the valve orifice is too small the flooding of the trap and separator would carry the condensation over into the engine cylinder or other apparatus.

It should be remembered that the rating given on a steam trap means that the trap has a capacity equal to the rating at some special pressure (which pressure should be clearly stated); also, that the trap can discharge a given amount of condensation per hour, providing the condensation is constantly coming to the trap.

There are conditions, however, where steam traps fail to handle their rated capacities, even when the maximum amount of condensation is much less per hour than their ratings. Such conditions arise when the condensation comes to the trap in slugs of water at intervals, and the trap is practically doing nothing the greater part of the time. This is one important reason why no steam trap should be given its maximum rating, and you should be governed by the size of the valve orifice and not the size of the pipe connection.

In selecting steam traps it is safe to say that in many cases it is guesswork. A good guesser may guess large enough. It may be well to put your trap problems up to some responsible trap authorities and hold them responsible for the selection and successful operation.

A Word About the Ratings of Steam Traps

There is a vast difference as regards the ratings of the various steam traps, and as the majority of the manufacturers do not mention the size orifice or the pressure upon which the capacities are based, there is no proof of accuracy, or means of determining what size trap to use for any given pressure, since the capacity of every trap varies with the pressure.

When you know the size orifice and the pressure upon which the capacities are based you are in a position to figure somewhere near the accuracy of the ratings.

You buy a steam trap to save the steam which would otherwise be wasted, and also to get the full efficiency of the apparatus to be trapped. In every case where you purchase a steam trap you have condensation. If your selection is made from some trap circular which gives the rated discharge capacity in pounds or gallons per hour, but which does not state the pressure at which the ratings were made, how do you know you are getting the proper size trap for the work you require? Your trap may be wanted for a pressure of fifty pounds or one hundred pounds, and as the circulars do not state at what pressures the capacities are made, it is all guesswork. You may buy a so-called 1½ inch trap to do what may be done with a smaller size trap. To know which trap to buy you should know the orifice— this alone governs the capacity.

If you specify your steam traps by the size of pipe connection and the pressure it is an easy specification to fill and one that invites unfair competition. By specifying in this way you waive the real issue which you depend on to handle the condensation for your numerous apparatus, i.e., the size hole or orifice in the valve. This hole or orifice varies so in the different types of traps that you are obliged to accept what you get, as the specification is fully met when the trap furnished you has the size pipe connection and will operate on the pressure specified.

In specifying the size orifice and the pressure, you are forcing the manufacturer to meet actual specification of capacity, which is the first essential consideration. This method places all steam traps on a fair competitive basis so far as capacity is concerned. It proves the true merit of a trap. It will be the means of saving in weight, space, and fittings, and gives guaranteed assurance that the specifications are fully met and that you get what you pay for.

In every line of steam power equipment the apparatus is designed to meet certain standards. These standards are generally carried out to the minute to meet the actual conditions of the service for which they are intended. Valves, fittings, etc., are always specified standard, or extra heavy, and so on through the entire installation. Is it so with Steam Traps? No.

In most cases the trap is looked upon as of little importance and generally it is the price that succeeds. Many times the selection is some trap whose design of shell or casing is flat sided, or other than cylindrical, and yet this trap is to carry the same high pressure for which you particularly specified high pressure fittings. This is not a theoretical idea on the design of shells or castings, but a lesson learned from experience.

As a rule information regarding steam traps is misleading because manufacturers do not give the sizes of the orifice in their valves and the pressures upon which the capacities are based. There is therefore nothing upon which to disprove their claims or statements.

Some manufacturers claim that owing to their tremendous leverage or pulling force they can open a much larger valve than all others. But do they state how large a valve they can open? Why not? Because this is the hidden information that keeps every purchaser in the dark; and without this knowledge there is no way of making comparisons with other makes, or to disprove their claims or statements.

What you see in a steam trap, and what is of no importance, is the size hole in the pipe connection.

What you do not see, and what is of

the utmost importance is the size hole in the valve.

Steam traps are looked upon as necessary evils, and as a rule many who buy traps look at it in the light that a trap is a trap.

What apparatus is there that can save you more in steam and fuel than a good steam trap? What is there that is more wasteful than a poor trap? Such traps are not cheap at any price.

The question arises. How is one to know what is a good trap? The answer is, The valve is the trap.

No doubt all who use traps are familiar with their operation and the duty which they are to perform, and therefore should be able to make a comparison and form some opinion as to the merits of the different types. You cannot select a trap from pictures. You should see the valve. You should be the judge.

There is hardly another steam specialty on the market that so little is known about as the steam trap. There is no steam specialty on the market that is so much abused as the steam trap.

There is no steam specialty on the market so hidden from view—but always working in the dark—as a valve operating in a steam trap. There is no steam specialty on the market from which you expect so much, and for which you pay so little, either in price or attention.

Always remember it is the valve which must be relied upon to do everything you expect of a steam trap. It will pay you to examine that part of the trap when you buy.

Common Sense in Buying Steam Traps

When buying steam traps don't compare prices only. Compare the sizes of the orifices and what they can do.

When you buy a certain size valve, pipe, or fitting you are getting what you pay for. When you buy a certain size trap you don't know what you are paying for.

The only standard thing about a steam trap is the size of the pipe connection. This can be put on any kind of an iron box or casting; but the **everything** which determines the value of any trap, and which is not standard is the size of the valve orifice.

You cannot specify or buy a steam trap intelligently when you go by the size of pipe connection and the pressure. This method of buying would be similar to buying a 1½ inch valve with a valve seat choked down to a hole ¼ inch in diameter. You see the 1½ inch hole in the connection, but you don't see that ¼ inch hole in the valve seat. It is just so with steam traps. You see the pipe connection, but you do not see the hole. You buy a larger trap to get a larger hole, and for this larger hole you pay a larger price. Better compare the size of the hole and not the size of the pipe connection. This is the first step in buying steam traps intelligently. Then use a little common sense in selecting the valve.

Because this misleading method of buying and specifying steam traps has been so long used it has become universal. This practice has done much to divert the use of steam traps because it has given the manufacturer a chance to compete in a manner to deceive by making a steam trap so light, so small, and so cheap as to eliminate and waive every essential feature required in a steam trap which will serve the purpose for which it is intended. As long as it has the size pipe connection the manufacturer has met your specification. This sort of competition is unfair to the manufacturer who really produces a good article; and while the manufacturer of a good article loses by this misguided selection, the loss of the buyer is much greater, for he has made a purchase which is neither lasting nor efficient.

It is up to the man who buys and specifies steam traps to bring the trap up to the standard of equality of other steam specialties, so that the purchaser who is not familiar with all the hidden facts will be in a position to purchase a steam trap and feel that the steam trap will at least perform the work for which it is intended, the only other requirement being its lasting efficiency.

Every steam trap in operation having a tight valve spells economy. This economy is the saving of fuel and steam which would otherwise be wasted through a leaky valve.

When you buy capacity in your steam traps you get the most for your money; but capacity in a steam trap is no indication of steam economy.

Steam economy in steam traps can only be obtained by having absolutely tight valves.

In selecting tight valves it is well to look into the principle and construction of the various valves and see for yourself if these are such as to insure a tight valve.

Economy in buying steam traps is obtained by selecting the proper size trap for the service for which it is intended.

For all low pressures use full area valves.

For all high pressures select your trap according to conditions.

Every trap for any high pressure should have an orifice at least large enough so that small particles of scale can pass through the valve regardless of how light the service.

How to Obtain the Best Economy in Steam Traps

Select the best valve.

The valve is the most essential feature, because it is the valve which saves the steam. Capacity is the first consideration, and can be had by buying a large enough trap.

Steam traps become wasteful through a valve that leaks; therefore eliminate all balanced and pilot valves. It is doing well to make one seat tight, and a much harder proposition to make more seats tight.

Steam traps have been the cause of trouble and annoyance due to many causes, such as poor design, poor workmanship, etc., absence of any reliable information or data concerning them, and misrepresentation as to their ability to do certain work. The foregoing pages were written with the view of putting the steam trap problem in its true light, and to enable the purchaser to rely on positive facts regarding steam traps and their operation, instead of depending on the information of a salesman who knows steam traps only from a selling standpoint.

A TRULY PROGRESSIVE SON OF A —— PLUMBER

Turnkey, the plumber, had worked for thirty years without a holiday, and now that his son was taking a hand in the business, he felt that he might take a brief rest.

On his return he inquired how things had gone.

"Fine!" Tom responded. "There's no use in talking, dad, but I've made things hum! I've cleaned up everything—there isn't a single unfinished job on the slate!"

Mr. Turnkey turned pale.

"You mean to say you've finished with the bathroom at Brown's and the kitchen sink at Smith's?" he said slowly.

"Yes."

"And the leaky tap at the Laurels?"

"Um!"

"And the boiler at the Grange?"

"Sure! Why, those jobs had been hanging on longer than I could remember!"

"My boy," said Mr. Turnkey, sadly, "you don't realize what you have done! I've enough to keep me in my old age, but you, poor lad, have thrown away what were to have been your most valuable legacies! Those jobs paid for your education, and, taken care of, would have maintained you in comfort for the rest of your life!"

HAMILTON GAS-TRICKS.

Poor old Hamilton. Between the gas company products and tile drains under dwellings and buildings, the citizens are really up against it. The strange part of it all is that if Sanitary and Heating Engineers there had half a chance they could clean up both troubles.



AWARDED BIG CONTRACT

Messrs. A. Welch & Sons, Toronto, have been awarded the plumbing and heating contract for the Toronto Harbor Commissioners' new building.

NEW INCORPORATED COMPANY.

Seager & Company, Limited, has recently been incorporated and granted a charter. The capital stock of the company is $40,000, to carry on the business of sanitary and heating engineers and manufacture of sanitary appliances.

J. R. Seager is well known in Toronto, and for many years has carried on a plumbing and heating business at 779 College St., Toronto.

VISIT FROM THE STORK.

The friends of Geo. Trickey will be interested to know that the stork paid its first visit to his home Friday, April 20th, leaving a big fine son, who, it is to be hoped, will soon be able to take charge of a thriving heating engineering business. We are told he has already asserted his authority by taking up all the attention of his Mam and Dad.

REORGANIZATION OF MONTREAL CONCERN.

The business of H. L. Peiler & Co., of Montreal, has been re-organized recently and a new charter granted. The new concern will still handle a high-grade line of heating specialties, steam and hot-water. Mr. H. F. Peiler is well known in Canada as a heating expert, and will be actively interested in the new company.

The concern will be known from now on as the Mason Regulator & Engineering Company, Limited, 380 St. James Street, Montreal.

NEW PLUMBING BY-LAW UNDER CONSIDERATION

There is a new plumbing by-law under consideration in St. Boniface, Man., and a meeting of the trade, journeymen, and inspectors, is to be held at no distant date to discuss the one proposed. The trade throughout Canada should be interested to know this, because of the fact that these are the men best fitted to conduct such discussions.

One of the worst features in the sanitary engineering profession is that by-laws are as a general thing forced upon the trade without any consideration being given as to their practicability, and many clauses as a rule hang like a millstone around the neck of a practical man, and at the same time work untold harm to the public.

The most logical steps to take when such by-laws are to be put into force, is to have those men compile the laws, which they themselves know most about.

How would the lawyers feel if the man on the street drafted the laws of this, or any other country?

ASHBRIDGE BAY SLUDGE NUISANCE

"No real excuse exists for the continuance by the city of the Ashbridge Bay nuisance, for as far as the sludge itself is concerned, which is causing the trouble there, it can be treated at less cost if any cost at all, than the existing chlorination methods employed by the city," was the emphatic statement made recently by F. A. Dallyn, C.F., Provincial Sanitary Engineer. Mr. Dallyn was stating the conclusion he had arrived at as a result of his investigation during his recent trip to England into sludge cities, undertaken with the object of applying the knowledge gained to the treatment of problems of sanitation in Ontario, with particular attention to those of Toronto. The systems at Leeds, Brantford and Huddersfield, as well as that at Wimbledon under the British Admiralty, were carefully studied by Mr. Dallyn and much information gathered respecting them which will ultimate form an interesting report to the Provincial Board of Health.—The Toronto *Star*.

WINNIPEG PLUMBING DEPT. REPORT FOR MARCH

To the practical man, a few figures and tables speak volumes, particularly in connection with sanitary engineering construction.

The following table gives an itemized report of the work accomplished by the plumbing and sewer department of Winnipeg. Can one in our business for one moment imagine what state of affairs would exist in that fair city if such work were not carried out, or if it were carried out in a careless, impractical manner.

PLUMBING DIVISION.

Plumbing permits issued	52

INSPECTIONS.

Water tests	27
Smoke tests	27
Subsequent inspections	234
Miscellaneous inspections	28
Defects rectified	133

CONTRAVENTIONS.

One case was instituted against a man for doing plumbing work without a license, and he was fined $10 and costs, amounting to $12.35.

SEWER DIVISION.

Permits issued	4
Connections constructed	4
Inspections	103

FLUSHINGS.

Tank flushings, gallons	966,656
Hose flushings, gallons	650,000
Total gallons	1,616,656

"A MAN WITH FAIR IDEA OF GRAFTING"

Dear W. J. H.

Is the enclosed advertisement, culled from this morning's Free Press, one of those that come under the category of the type known as "You know what they mean?"

WANTED—OFFICE MAN WITH KNOWLEDGE of plumbing and heating supplies, preferably a man with fair idea of grafting. Apply to Mr. Glenister, Ashdown Hardware Co., Ltd.

Peradventure an applicant with the qualification thus set forth by an "absent-minded compositor" might be well advised to apply to the late Provincial Government, what?

It reminds me of an advertisement I once inserted for a book-keeper, in reply to which one young hopeful informed me that he was "a good performer on the adding machine, and a good manipulator of figures."—P. Q. Y. Z.

Winnipeg, April 18.

A type-setting machine, even when operated by the least absent-minded of compositors, will sometimes give down a "g" for a "d." . . . And, by the way, would not this be an excellent place to work in one of the staple pieces of newspaper facetiousness, by asking whether plumbing, which is mentioned in the advertisement, does not include grafting?—Winnipeg *Free Press*.

If this had been an advt. for a compositor, the *Free Press* would have got "up in the air" but as it refers to the plumbing trade that most unjustly maligned class, the *Free Press* is ready to excuse the error. There is some consolation is seening that plumbers are not the only men who err.

TORONTO PLUMBING DEPARTMENT REPORT

The accompanying table shows the amount of work which came before the staff of the plumbing department for the month of February, 1917.

The first item shows that the public are beginning to realize that inspections are necessary and appreciated by the fact that no less than 686 requests were received.

This would not appear to indicate that the public were inspected to death, as some of our City Council would have us believe.

Smoke Tests

Ninety-eight smoke tests were put on, which also indicates that the service of this department is one that cannot safely be dispensed with.

Plumbing Permits Granted

An increase of permits granted, too, is shown. What would be the use of granting permits if this very important department were dispensed with? And note that out of 143 permits issued, nearly half of the plans had to be amended, which proves that nearly 50 per cent. of the plumbing work for which permits were granted in February, would have been installed in an unpractical manner, again proving that the Toronto plumbing inspection department is absolutely indispensable.

The balance of the report is self-explanatory and needs no comment.

DIVISION OF PLUMBING AND DRAINAGE.

Toronto, February, 1917.

Inspections.

		Increase	Decrease
Inspection requested	686	13.75%	
Inspections made:			
Plumbing	535		
Drainage	229		
Smoke test	98		
Total	862	3.75%	
Letters	257		
Notices	1,064		3.65%

Permits Issued for Installation of Plumbing.

Permits issued	143	0.75%	
Buildings represented	167	10.00%	
Amended plans	70	32.00%	

Registration of Plumbers.

Under Police Commissioner's By-law No. 90.

Plumbers registered		67
Certificates issued		58
Notice of Board Meetings		0
Candidates examined		0

Police Court Proceedings.

Cases in Court, February 1st, 1917	3	
Summons issued in February	1	
		— 4
Cases withdrawn from Court	0	
Cases adjourned	1	
Cases remanded	0	
Cases fined	1	
Cases in Court, February 28th, 1917	2	
		— 4

A NEW SERVICE ENTERPRISE

When a certain decision was arrived at in a case before a Montreal Judge, in which a firm of sanitary engineers were left no other alternative but to sue one of their customers for an account, the amount being specified as "overhead expenses" or "cost of doing business," it proved that overhead expenses were and are in the eyes of all thinking men, a legitimate transaction. Please note that we said "thinking men," please also note that we said "cost of doing business."

Look the business world over and try to find out what a business man's chief aim as a general rule is to do first. He tries to cut down his cost of doing business. How is he to do this?

First by proving he has a service to sell, a degree of ability that he can put into operation which will be a benefit to the people with whom he must come into contact.

Next, he must employ every means to cut down "cost of doing business" because in actual fact, that part while very essential, does not materialize directly to the customer's benefit. The next thing he must do is to make sure of sufficient returns for his labor, and the goods he sells, both are sold or dealt in on trust.

The person who buys or acquires possession of goods and does not in a proper business-like manner make preparations to pay for those goods, is not an honest man, he is a thief of the worst kind.

But he may not be a thief wilfully, and this fact makes it more serious. The person who believes he speaks the truth, but because of being possessed of a wrong viewpoint does not do so, is far more dangerous than an out and out liar.

Now, as every reader of The SANITARY ENGINEER knows, one thing which sanitary and heating engineers lack more than another, is the true conception of "overhead" or "business cost." No one person has been more convinced of this fact than has C. D. Henderson, business manager of one of the most progressive sanitary and heating concerns in Western Ontario, if not in Canada. Mr. Henderson has worked out a scheme that will cut down an "item of cost," that actually will increase and ensure profits for his clients. If his services are demanded, he will show, for a very modest sum how to procure more profits, better service to the customers of his clients, and once and for all cut the rash, gambling element out of a man's business.

The scheme has been tried and proved by a large number of sanitary and heating engineers. And as one reader of The SANITARY ENGINEER stated to the writer very recently:

"It is worth 25 times more to me than the service costs. It saves my time, it saves me anxiety and when I sell an article, I know at once that the transaction is fair to my customer and profitable to myself."

Full particulars may be procured about this service which Mr. Henderson has at his disposal by writing to P.O. Box 123, Brantford, Ontario.

MANUFACTURER OF PLUMBING SUPPLIES MOVES TO NEW STORE

The Speakman Supply & Pipe Company recently opened their new store at 816-822 Tatnall street, Wilmington, Delaware, having outgrown the space afforded by their old property at 113 Market street.

The Speakman Supply & Pipe Company has been in business forty-eight years. They have gradually grown from a small plumbing business to a large manufacturing concern. Their Riverview factory (Wilmington) covers an entire city block. This business will continue to be in charge of Allen F. Lewis and John C. Sinclear, who have efficiently managed the store department for a number of years and have an intimate knowledge of the supply business, and enjoy the esteem of the plumbing fraternity of the entire territory covered by their activities.

The store sales force consists of W H. Kratz, J. L. O'Neill, and R. C. Bamberger, all young men who are thoroughly alive to the requirements of the plumbing, heating and mill supply trade.

HOUSING COMPANY FOR GALT

To provide Galt with more workingmen's homes, which are badly needed, the Board of Trade has appointed a committee to go ahead with the organization of the Galt Housing Association, under the Ontario Housing Act. The association will be similar to that organized in Toronto. The proposal is to capitalize the association at $40,000, $15,000 to be subscribed in stock, and $25,000 raised by issue of bonds by the municipality.

PRACTICAL SHEET-METAL WORK

THREE PIECE ELBOW WITH GUSSET OR GORE PIECE.

BY THOMAS STANFIELD

PREVIOUS articles that have appeared in this course, have described chiefly the development of patterns for branches tees and elbows of various kinds, the following articles will take up the development of all kinds of furnace fittings such as register boxes, boot reducers, tapers, offsets, stack pipes and fittings.

And as these articles appear their necessity will also be described.

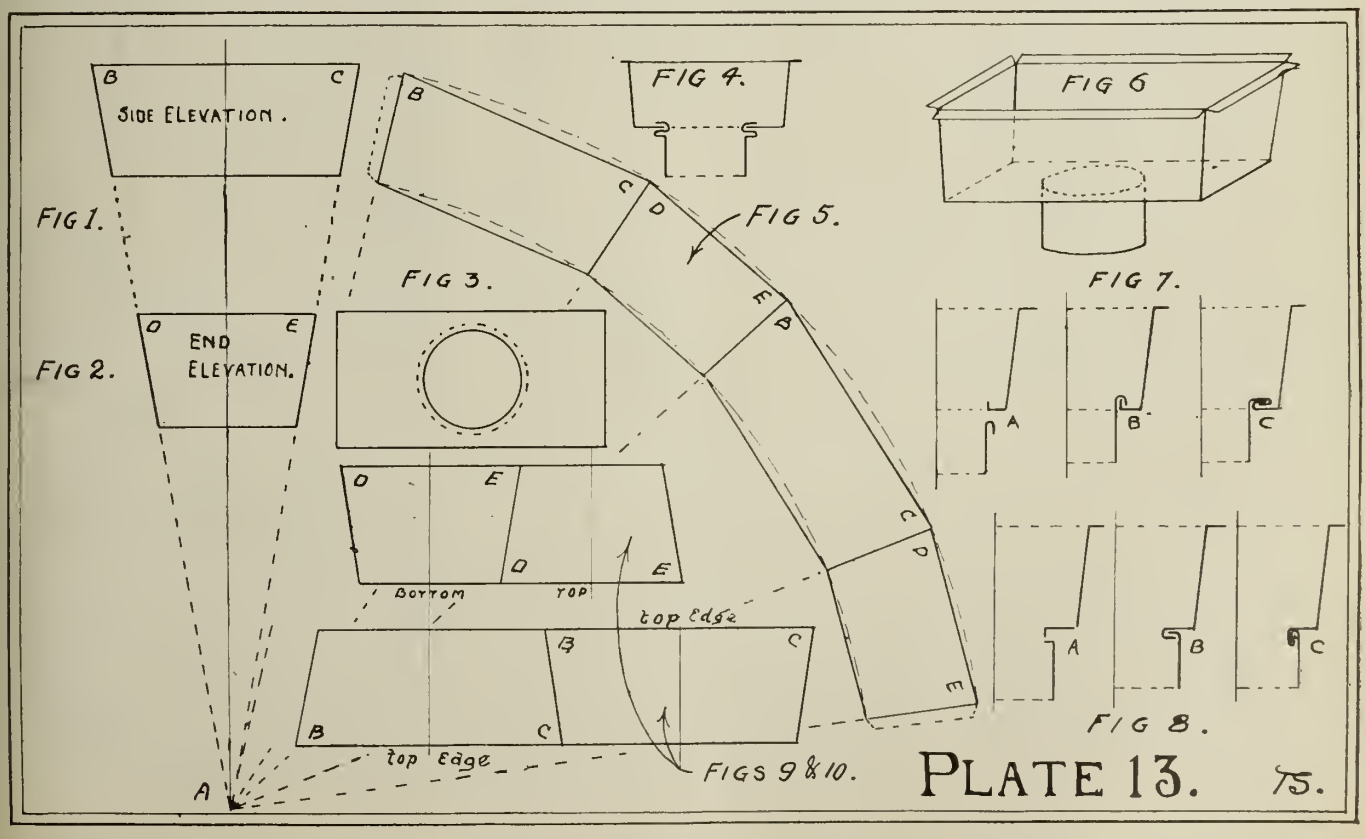
In this article a number of methods are shown for developing an ordinary register box, round to rectangle, with a slight taper. Fig. 1 and 2 show the side and end elevation with the necessary taper, and Fig. 5 shows the development pattern.

First determine the desired taper of the box and centre of same. Then extend the dotted lines as shown until they both meet at point A. Now using A as centre open up the compasses and draw two circles as shown by dotted lines in Fig. 5, and transfer the measurements BC. DE. alternately to the circle of dotted lines. Now place the straight edge at point A and cut the circle at points B. CD. EB. CD. and E. as shown. This, when allowance has been made for top edge and side and bottom seams, will complete the pattern for side of register box, which, it will be noted, is in one piece.

It is however possible to make this pattern in a number of ways, and Figs. 9 and 10 show another way. The size and taper has been determined and allowance made for locks and seams. Take a sheet of material and simply cut in manner shown at points DE. and BC. in Fig. 9 and 10, lock the corners in the usual way. Fig. 3 shows the bottom piece with round hole for pipe to fit into, this round pipe may be fitted in a number of ways. Fig. 4 shows that which is, perhaps, the simplest. First take the small turner and make a deep bead on the pipe to serve as shoulder, not too much at once, or the metal is liable to cut. Take care that the hole in the bottom is a neat fit. Then enter the pipe into the hole snug up to the shoulder and hammer the projection over as shown.

Figs. 7 and 8 show two methods in three operations each. In Fig. 7, A. the bottom of the box is turned up, the pipe turned down, B shows the pipe in place, C shows the completed lock This is termed an inside seam and it no doubt makes a strong point. Fig. 8, A shows the first step, with the material in the bottom of box turned down, the pipe turned in, B. shows the first half of the lock made. C shows the completed joint. Both these latter joints are much stronger than Fig. 4, but Fig. 4 is a time saver, and in many cases so long as the joint is fairly tight it is not necessary to put too much time on the job. Fig. 6 shows a perspective line drawing of the completed register box.

(Continued in next issue)



Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Advances have been numerous in plumbing lines during the time intervening since last issue. Soil pipe and fittings have been moved to higher levels. A general advance has been made in all lines of plumbers' enamelware and range boilers. Plumbers' spun oakum has been advanced in some quarters from the lower levels. Sheets and plates have registered increases and dealers in old materials are paying higher prices for old cast iron and stove plate. Declines, however, have been recorded in the prices being paid for old brass and copper. Solder wire is easier in price and is quoted lower. Corrugated sheets are in firm market and there is strong probability that they will be increased in the near future, due to the fact that black and galvanized sheets have been enhanced in value and to be on a parity corrugated sheets should be at higher levels. Demand for corrugated sheets is within narrow limits. Boiler tubes are also in firm position due to a recent advance in this commodity in the United States. There has been a good demand for valves for marine work and manufacturers look forward to a still heavier demand when contracts for ships now pending have been let. Dealers in plumbing supplies in some instances report a heavier demand for many lines, due to greater activity in building circles.

TORONTO, April 28.—Price changes in the upward direction have been somewhat sweeping, affecting such lines as enamelware, range boilers, soil pipe and fittings, oakum, black sheets and old materials. Reports are encouraging with respect to the demand for valves and other lines used in the construction of dwellings. Some manufacturers state there has been considerable building of moderate-priced dwellings both in the larger cities and in smaller towns. In the building of ships and the development of shipbuilding plants there has been a very gratifying demand for valves. This demand is expected to be even heavier when certain contracts for ships are placed among various Canadian concerns. It is asserted that contracts for upwards of one hundred additional ships will soon be placed with shipbuilding plants in this country.

Scarcity of Wrought Iron Pipe Noticeable

WROUGHT IRON.—Manufacturers of wrought iron pipe report they are unable to get sufficient supplies of raw materials to meet the demand for the finished product. There is a fair demand, but the meagre supplies of pipe are insufficient to meet it. Pipe is accordingly in firm position, although no advances have been recorded in the time intervening since last issue. Following are the prices prevailing:—

WROUGHT IRON PIPE PRICES.
Effective April 10, 1917, superseding all previous lists.

Buttweld—	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 4 50	$ 6 00
¼ in.	4 32	6 36
⅜ in.	4 32	6 36
½ in.	5 61	7 18
¾ in.	7 02	9 14
1 in.	10 37	13 52
1¼ in.	14 03	18 29
1½ in.	16 78	21 86
2 in.	22 57	29 42
2½ in.	36 27	47 09
3 in.	47 43	61 58
3½ in.	58 88	75 90
4 in.	69 76	89 93
Lapweld—		
2 in.	25 53	32 01
2½ in.	38 03	48 26
3 in.	49 73	62 18
3½ in.	60 72	78 66
4 in.	71 94	93 20
4½ in.	83 82	108 60
5 in.	97 68	126 50
7 in.	126 70	164 50
7 in.	166 60	213 00
8 L. in.	175 00	223 80
8 in.	201 60	257 80
9 in.	241 50	308 80
10 L. in.	224 00	286 40
10 in.	288 40	368 70

Terms 2% 30 days, approved credit.
Prices Ontario, Quebec and Maritime Provinces.

Soil Pipe And Fittings Advance 10%

SOIL PIPE, FITTINGS.—An advance of approximately 10 per cent. has been made in the price of soil pipe and fittings through the change of discount. Medium and extra heavy soil pipe of 6 inches and under is now quoted at 50 per cent. off list, while the fittings for the same size pipe are now 50 and 10 per cent. off list. For the 8-inch soil pipe prices remain unchanged at 40 per cent. off list. Malleable fittings and cast iron fittings remain unchanged at net list and 35 per cent. off list, respectively.

	Discount
Medium and extra heavy soil pipe, 6-inch and under	50%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	50% and 10%
Malleable fittings	Net list
Cast iron fittings	35%

Valves For Marine Work in Good Demand

VALVES.—There is a continued good demand for valves for marine work, owing to the number of ships that are now in course of construction and the new plants and additions to shipbuilding plants that are under way or contemplated. This is a demand that is expected to be heavier still when projected contracts for some one hundred new ships have been placed with Canadian shipbuilding plants. There are also encouraging reports from some dealers with respect to the number of valves required for dwellings. Prices of valves have held steady, no changes having been recorded.

Ground work	35-53
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	10
Radiator valves, standard	15
High grade	15
Patent quick opening valves	55
Basin Cocks—	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	35-40
Radiator valves, standard	40
Radiator valves, Jenkins disc.	45
Radiator valves, quick opening	45

Enamelware And Range Boilers Make Advance

ENAMELWARE AND RANGE BOILERS.—An advance of 50c in the price of range boilers has been recorded during the week, which now makes the selling price of the 30-gallon standard boiler $11 and of the 30-gallon extra heavy $13.50 each. In enamelware of various kinds there has been an approximate advance of 10 per cent. Bathtubs and sinks have been the big selling lines that have been affected primarily. In this instance of bathtubs the 4, 4½, and

5-foot sizes are now quoted at $28.50 as compared with the former price of $25.80. On 5½-foot bathtubs the new price is now $32.10, as compared with the former price of $29.40. Roll-top sinks, 18 x 30 inches are quoted at $14.60 each while the size 20 x 30 inches is $15.55. Advances are attributed to the higher cost of raw materials and labor.

30-gallon range boilers, standard	$11.00
30-gallon range boilers, extra heavy	13.50
Bathtubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	28.50
Bathtubs, 5½ ft.	32.10
Sinks, roll-top, 18 x 30 in., staple	14.60
Closets	21.00

Plumbers' Spun Oakum Moved Up

Toronto.

OAKUM.—After remaining stationary for some months, the price of plumbers' spun oakum has been increased ½c per pound by some concerns who had been quoting at 8c per pound previously. The general quotation in the market is now from 8½c to 9c per pound. Other grades of oakum remain unchanged. Following are the quotations:

	Per 100 lbs.	
Best American	$20 75	$21 00
U.S. Navy (American)	....	20 00
Clipper U.S.	....	17 00
U.S. Navy (English)	....	17 50
Plumbers' Spun	8 50	9 00

Black Sheet Prices Have Been Readjusted

Toronto.

SHEETS, PLATES.—There has been a firmness in the market for black sheets during the week, with some dealers moving their prices upward somewhere near the basis of the higher market quotations announced last week. The price of black sheets is stated to be somewhere near a parity with prices in the United States. In galvanized sheets there has been a movement toward higher levels by some concerns during the week, with the intimation that they are likely to go higher in the near future. Premier brand remained unchanged during the time intervening since last issue.

	Per 100 lbs.	
10 gauge	$7 00	$....
12 gauge	7 10	7 05
14 gauge	7 00	6 95
16 gauge	7 10	7 00
18-20 gauge	7 15	6 80
22-24 gauge	7 20	6 85
26 gauge	7 25	6 90
28 gauge	7 35	7 00
29 gauge	....	7 10
¼-inch boiler plate	....	7 50

Wire Solder Has Advanced 1½c Pound

Toronto.

LEAD AND ZINC PRODUCTS.—Wire solder has been increased in price during the week by 1½c per pound, which makes the selling price now 36½c. There has been a good demand for lead and zinc products during the week. Pig lead in the primary market was slightly easier in price, but not sufficient to affect the price of products. Other lines of these commodities remain unchanged.

Lead pipe, lb.	$0 16	....
Lead waste pipe, lb.	0 17	....
Lead traps and bends	Plus 10%	....
Lead wool, lb.	0 16	....
Lead sheets, 3 lbs. sq. ft.	0 17	....
Lead sheets, 3½ lbs. sq. ft.	0 17	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 16	....
Solder, guaranteed, lb.	0 37	....
Solder, strictly, lb.	0 35	0 40
Solder, commercial, lb.	0 33	0 37
Solder, wiping, lb.	0 33	....
Solder, wire, lb.	0 36½	0 52
Zinc sheets, per lb.	0 26	....

Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.

Corrugated Sheets May Move Upward

Toronto.

CORRUGATED SHEETS.—There is strong probability that the price of corrugated sheets may be moved to higher levels in the near future, as dealers point out with the recent advances in black and galvanized sheets the price of corrugated sheets does not place them on a parity of value when the extra work entailed in corrugating is taken into consideration. Demand for corrugated sheets, however, continues to be light. Prices during the week remained unchanged.

	Galvanized Per 100 Sq. Feet	Painted Per 100 Sq. Feet
No. 28 gauge	$ 6.50	$ 5.50
No. 26 gauge	7.00	6.25
No. 24 gauge	11.00	8.50
No. 22 gauge	12.25	10.50
No. 20 gauge	15.50	13.00
No. 18 gauge	20.00	16.50

Boiler Tubes Are In Firm Position

Toronto.

BOILER TUBES.—Due to the position in the United States, where it is stated warehousemen are in some instances quoting boiler tubes higher than they are selling for in Canada, there is naturally a firm position in the Canadian market. A recent advance of 5 per cent. was made effective in the United States, but Canadian dealers have not yet followed upward in conformity with this advance. Prices locally remained unchanged during the week.

	Per 100 Feet Cold Drawn	Lapweld
1-inch	$24.00	$ ....
1¼-inch	30.00	....
1½-inch	32.00	25.00
1¾-inch	32.00	25.00
2-inch	35.00	26.00
2¼-inch	37.00	....
2½-inch	44.00	33.00
3-inch	47.00	38.00
3¼-inch	....	45.00
3½-inch	59.00	48.00
4-inch	74.00	60.00

Brass And Copper Down; Old Cast Iron Up $3

Toronto.

OLD MATERIALS.—The weakness noted in the market for old materials, particularly in brass and copper, which was noted last week, has manifested itself in lower quotations that are being made this week. Yellow brass is down 1½c per pound; red brass declined 2c; heavy copper is down 1½c. Old heavy lead pipe, on the other hand, is firmer by ½c, and is now quoted at 10c per pound. Heavy zinc has also declined ½c. Old cast iron has been advanced $3 per ton, and stove plate is up $3.50 per ton. The condition of the market for ingot copper in the United States, where lower prices prevail, has affected the market for old brass and copper.

	Per lb.	
Tea lead	$ 0.06½	....
Heavy lead pipe	0.10	....
Yellow brass	0.14½	....
Red brass	0.19	....
Light brass	0 10	....
Heavy Zinc	0.09	....
Heavy copper	0.24½	....
Old cast iron, per ton	23.00	....
Stove plate, per ton	18.00	....
Old rubbers, boots & shoes.	0.08½	....
Overshoes, lumbermen's rubber boots	0.06½	....
Bicycle tires	0.02½	....
Auto tires	0.06	....

Steady Demand For Ingot Metals

Toronto.

PIG IRON.—The situation in the pig iron market is unchanged from last week. A quotation on domestic pig iron is practically unobtainable owing to the unsettled conditions prevailing. Hamilton pig iron is off the market, and there is very little Victoria iron to be had. At Buffalo the situation is very firm. Furnace interests at Buffalo are asking $45 for this year and $40-42 for shipments during first half of next year.

INGOT METALS.—There is a continued steady demand for ingot metals, with practically no change in the local situation.

COPPER.—The market locally is unchanged, and price remains at 38c lb.

TIN.—The market in New York is firmer, but quiet. Locally there is no change in the situation, and the quotations range from 57c-58c lb.

SPELTER.—Spelter is in good demand, with stock very light. Prices locally unchanged at 13c to 15c lb.

LEAD.—Buyers in New York are crowding into the market, and supplies are scarce. Producers are discouraging speculation. Local price, 12c-13c lb.

ANTIMONY.—The scarcity of spot metal continues. Quotations firm and unchanged at 35c-36c lb.

ALUMINUM.—The market is quiet but firm, and quotations are unchanged at 68c per pound.

WHAT IS THE DISCOVERY?

Wonderful things have been accomplished in recent years in the way of hardening aluminium. A good story is being told of how an aluminium company surpassed itself by accident. The firm was under contract to supply material for making speed indicators for aeroplanes. It was duly delivered to the instrument making people, who found that the stuff was of unprecedented hardness, and unsuitable for the job. The aluminium firm explained that they had put all sorts of scrap and sweepings into the melting-pot, and now they are at their wits' end to discover the secret!—*Irish Ironmonger.*



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

SEWAGE DISPOSAL NEAR LAKE

Editor The SANITARY ENGINEER.

I have been asked to lay out a plumbing job for a house that is situated on a hillside near a lake. The house lot is very narrow, and using the information already procured in The SANITARY ENGINEER proves to me that I would not have room for a regular sewage disposal tile bed. The house is only about 100 feet from the lake and the lawn is already nicely sodded. Can I instal a sewage disposal system that would allow of me putting the discharge pipe into the lake?

Enclosed is a rough sketch of the situation.

RURAL PLUMBER.

Fig. 1 is the sketch sent in by rural plumber, but as he does not furnish us with any information as to the number of persons that are likely to reside in the house, or are at present so doing. We cannot give the size of the tank, etc. required.

Fig. 2 and 3 however shows how we would advise him to provide a system suitable for such a situation.

It will be seen that the septic tank is still situated near the house and the drain from the dosing chamber runs to what might be termed a filter bed. This is provided to further purify the sewage, and take the place of the disposal field tile bed. The sizes of the septic tank given in previous issues may be followed, but the filter bed size is not given. It should however be sufficiently large to hold at least as much as will be discharged from the dosing chamber at one operation. The filter bed should be made water tight so that no water can get into the bed in any way, or leak out for that matter.

The drain pipe from the dosing chamber should be laid at an even grade, and if too near the ground, it should be protected from frost by covering with good straw manure before filling in the trench.

It will be noted that the septic tank too, can be placed well down in the ground in this case, because of the fact that the field tile pipe bed is not required to be just below the ground for further bacteria action of the sewage. It may be that the elevator of the ground will allow of the drain being laid below the basement floor and in this case, the septic tank would require to be built lower so as to take care of laundry tub waste water.

If the septic tank for the above reason is installed deep down, it would be advisable to have two man-hole covers inserted in the top of the tank.

This can be done by using large clay tile or cement pipes for the extension prices and then placing a cover over the top in the usual manner.

It must not however be forotten that the top of filter must be slightly lower than the outlook of the syphon in the dosing chamber at the septic tank, also that the top of the fluid in the septic tank must be below the level of the basement floor at least one foot.

(See page 30 for Fig. 3)

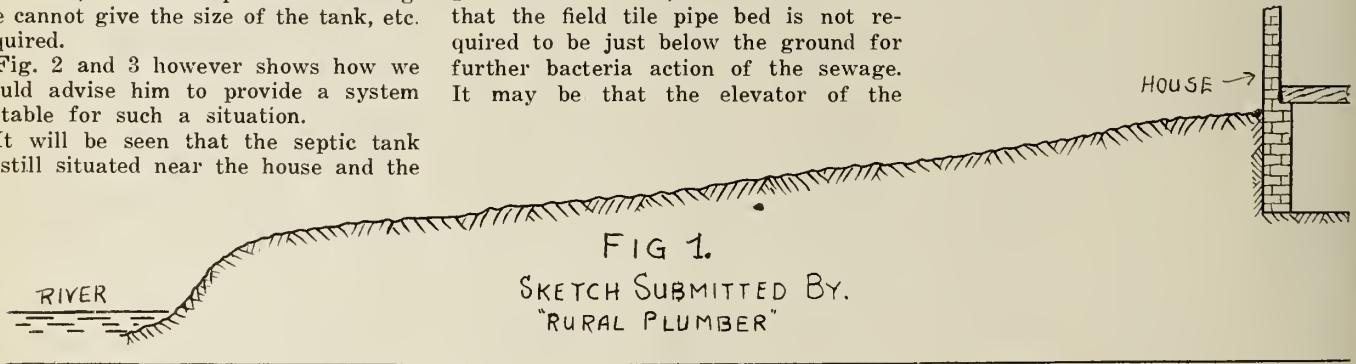


FIG 1.
SKETCH SUBMITTED BY.
"RURAL PLUMBER"

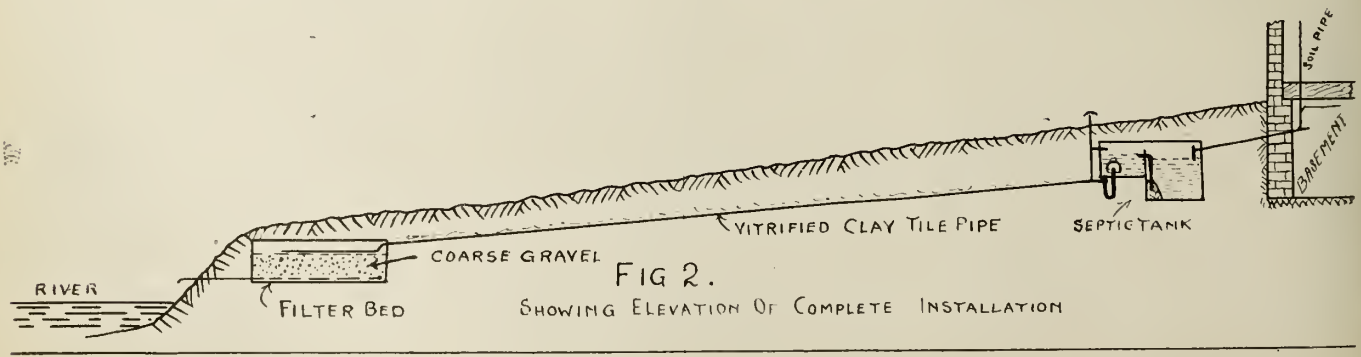


FIG 2.
SHOWING ELEVATION OF COMPLETE INSTALLATION

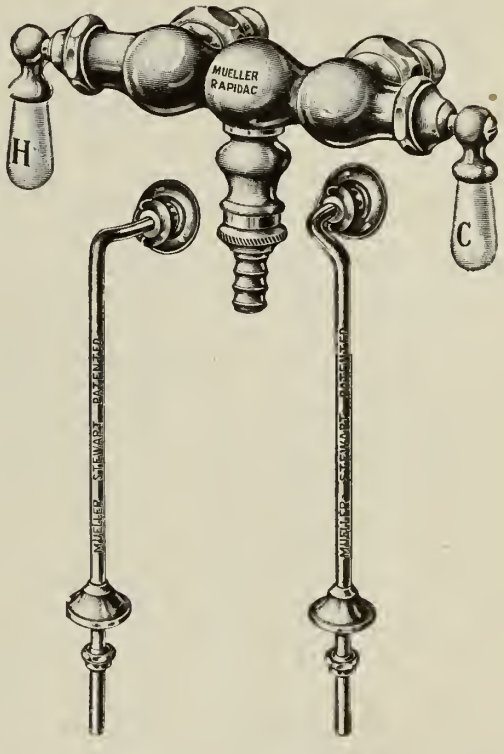
The Goods You'll Eventually Buy Just Examine This Illustration

It is fuller in design, compression in action. Our Rapidac line is made up in several styles and designs.

MUELLER Rapidac

QUALITY FIRST

When asking a customer to buy, you always explain the splendid quality, the lasting service, etc., and finally you guarantee the goods. Which means you put quality first.



PRICE SECONDARY

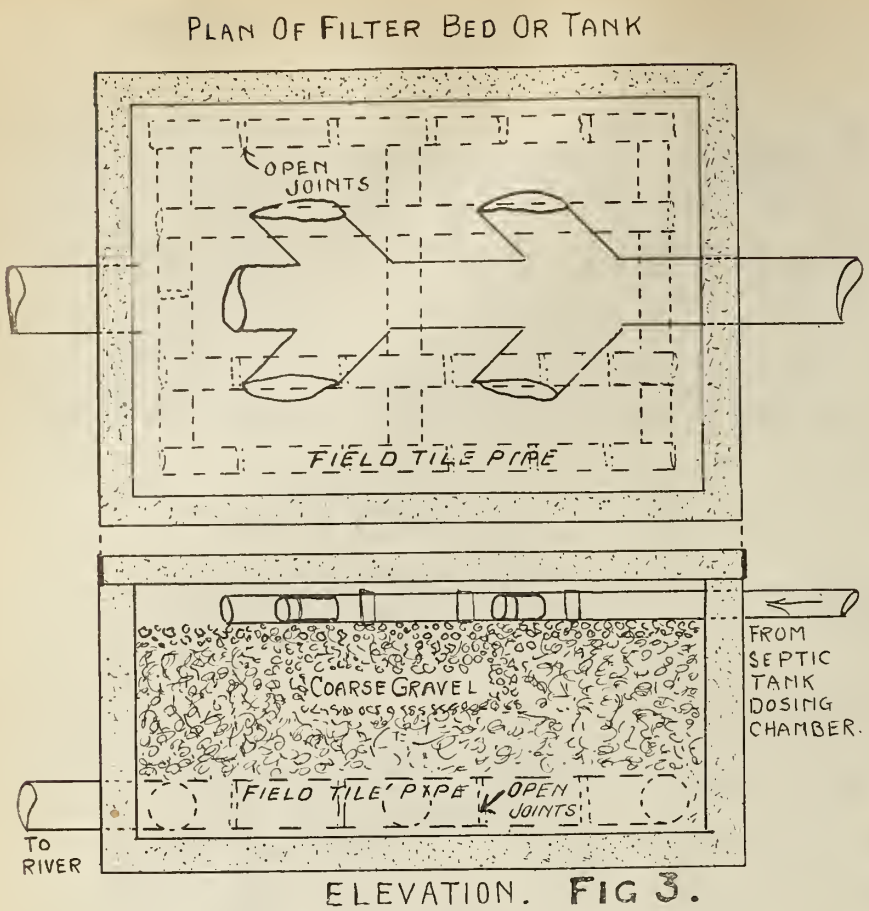
Then you are asked the price, you discuss this subject at length, but Quality always justifies any argument involved. This proves that price is secondary.

NO SUCCESSFUL BUSINESS was ever built up on price only. It is quality that counts. Our goods are big business builders. Let us help to build up your business.

Sold by all Jobbers Throughout the Dominion

H. Mueller Manufacturing Co., Limited

SARNIA, ONTARIO



Above illustrations relate to the question on page 28.

NEW CANADIAN PATENTS

(Continued from page 20.)

an actuating lever having a bearing for supporting said cutter head for rotation substantially in the flatwise plane of said lever, and a feed connection between said cutter head and lever.

4. A tool of the class described comprising a rotary disc cutter head having cutting faces at one side thereof and also having a circuit of ratchet teeth substantially in the central flatwise plane thereof, an actuating lever for said cutter head, and a feed pawl carried by said lever and co-operative with said ratchet teeth for turning said cutter head.

5. A tool of the class described comprising a rotary disc cutter head having means at its axial center for attaching it to a part outside the tool for rotation, a cutter carrier and a feed connection between said cutter head and cutter carrier.

173,190.

The Walsh Manufacturing and Heating Company, Incorporated, assignee of Eugene B. Walsh, New York City, New York, U.S.A., 14th November, 1916; 6 years. Filed 29th December, 1915. Receipt No. 259,359.

Claim.—1. In a pressure valve, the combination with a reservoir adapted to contain water under pressure and having a water supply connection and a threaded opening near its lower portion, of a diaphragm casing comprising two sections secured together, a diaphragm held between said sections and disposed normally rectilinear, one section having a reduced threaded extension for engagement with the threaded portion of the reservoir, the other section of the diaphragm casing having an angular fitting integral therewith and provided with a valve seat, a valve connected to the diaphragm at the central portion thereof and operating through said diaphragm section to co-operate with the valve seat and regulate the size of the passage therethrough, a supply pipe connected with one end of said angular fitting, and a burner communicating with the other connection and receiving a supply of fuel therethrough for the heating of the water in the reservoir, variation in the internal pressure.

PURO

(MADE IN CANADA)

Every minute counts in getting maximum efficiency.

Our Puro Sanitary Drinking Fountains positively save 60% in drinking time, besides 35% of water ordinarily wasted. Can you afford to run your plant and lose and waste this money in old-fashioned drinking methods?

EFFICIENCY IS PATRIOTISM



Ask your efficiency expert to figure this out and you will find that:

500 men drink, say, twice a day. Under old conditions it takes between 3 and 5 minutes per man, twice a day. With PURO cutting the time in half, it would save from 1,500 to 2,500 minutes per day at an average wage of 20c per hour. The saving would be from $5.00 to $8.50 per day.

How long would it take to pay for installing our fountains?

NOW IS THE SEASON TO THINK OF YOUR WATER PROBLEMS.

ASK OUR EXPERT ADVICE.

Puro Sanitary Drinking Fountain Co.

147 University Ave., TORONTO, CAN.

"B & C"

COMBINATION

Floor and Ceiling PLATES



No. 10 Steel
3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

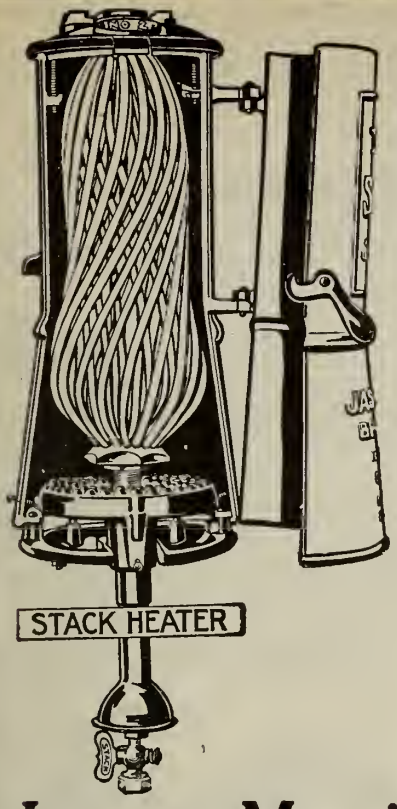
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MANUFACTURED EXCLUSIVELY BY THE

Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:

W. H. CUNNINGHAM, 98 Kingswood Rd., Toronto, Canada.



THE SECRET OF POWER

IN THE

Stack Gas Water Heater

Why can the STACK produce a hot water service which is far in advance of any other tank heater? The answer is so simple and apparent as to be easily missed.

Hot water naturally rises immediately upward—not sideways, but up—straight up.

The STACK is built more nearly to allow this direct, straightway, upward movement than any other heater.

Test yourself the truth of this statement.

Write for Booklet.

EASILY SOLD **BIG PROFITS**

James Morrison Brass Mfg. Co., Limited

93-97 ADELAIDE STREET WEST, TORONTO

Our Mixed Metal Sales Amount to Over $5,000,000 Annually

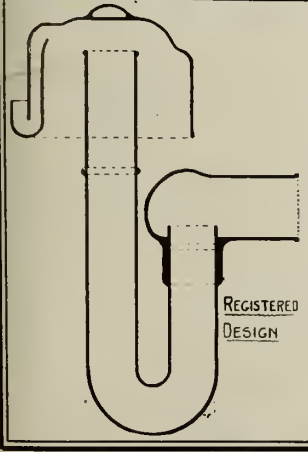


HOYT'S WIPING SOLDER is as perfect as experience and first class ingredients can make it. As only one perfect Wiping Solder can be made we manufacture only one grade, which must necessarily be Hoyt's high standard of quality.

Special attention is called to our Bar Solders, Wire Solders, Lead Pipe, Waste, Traps and Bends. Your orders will have prompt and careful attention, not sometimes—but all the time.

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y.; London, Eng.; St. Louis, Mo.



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

Ask your jobber for "Anthes" Syphons and accept no other.

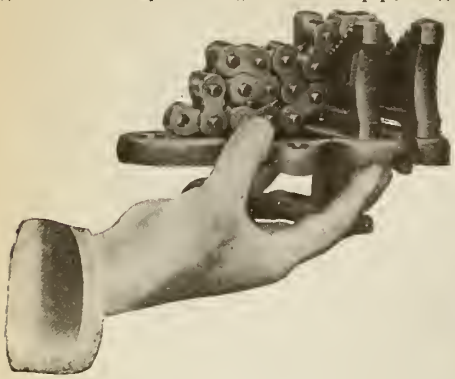
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SINCE IT'S ONLY A HANDFUL

WHY LEAVE IT BEHIND?
3 Sizes Capacities ⅛ to 8 inch pipe



WILLIAMS "VULCAN" CHAIN PIPE VISE

Before you return you may need to turn a thread, make a bend, cut off an end or perform any of the other ordinary operations for which a steamfitter is usually summoned.

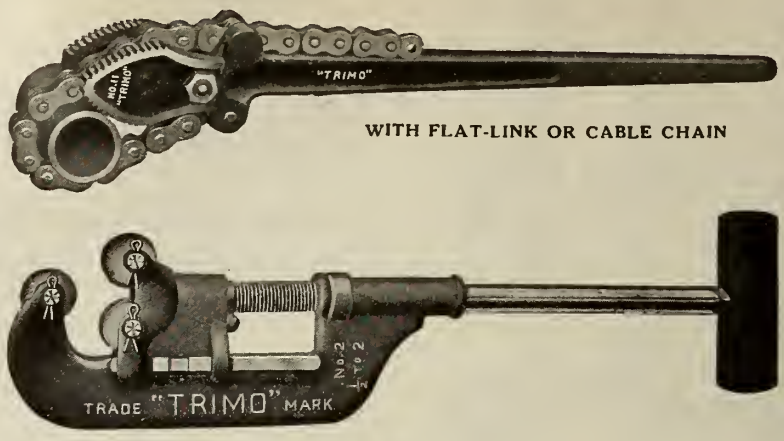
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The Wrench People

World-Famed Specimens of the Age of Steel

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TOOLS

WITH FLAT-LINK OR CABLE CHAIN

Send for Catalog No. 91

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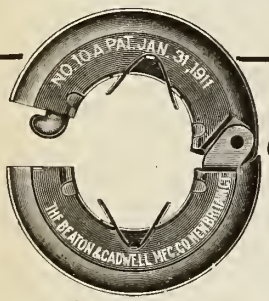
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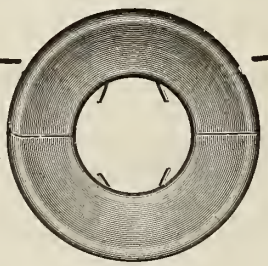
Cleaning screws, and drain checks, prevent flooding. Machinists, Brass Finishers and Plumbers specialties.

MALCOLM and COMPANY
64 Lombard St., Toronto



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The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



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The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

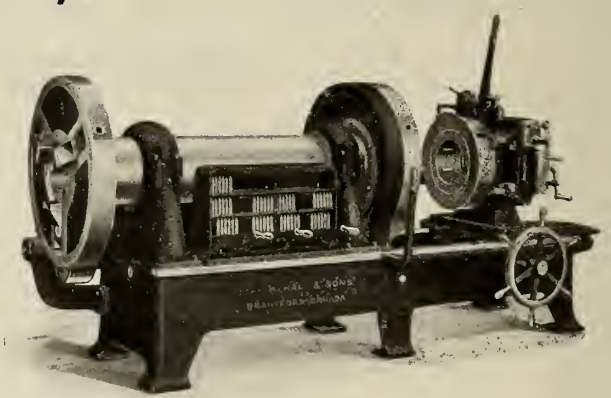
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New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

Pipe Machines of Merit



THE HALL No. 8

Duplex Improved Gear Box Driven. Capacity 2½ in. to 8 in. inclusive.

Note the drive belt at rear out of operator's way. Elevated die cabinet, control lever and speed levers all convenient to operator's right hand. Sliding die head

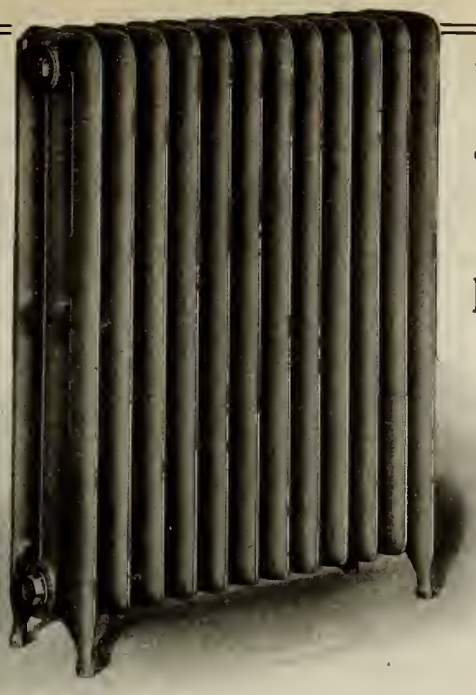
These machines are equipped with a friction clutch, enabling operator to revolve pipe a few inches, if necessary.

Pipe Machines ranging from ⅛ to 18".
Nipple Machines ranging from ⅛ to 4".
Roller Pipe Cutters ranging from ⅛ to 4".

Delivery from stock.

Write us for full particulars and prices.

John H. Hall & Sons, Ltd., Brantford, Can.



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Represents the Most Advanced Method of Heating

Years of experience and research have resulted in the production of a radiator that embodies all that is known to the science of modern methods of heating.

The Imperial Radiator is designed to assist free circulation of water—smooth inside to avoid unnecessary friction.

Has been giving utmost satisfaction for years. Those who know it say that it gives off more heat per square foot than any other make. You are SAFE when you decide in favor of the "IMPERIAL."

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STEEL AND RADIATION, LIMITED

Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

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DART

BIG TIME AND LABOR SAVERS

By the use of Figure 1 you save two threads, do neater work and make sure that the connection is trouble-proof.

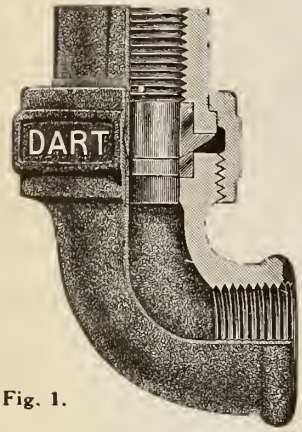


Fig. 1.

Dart Union Elbows

(Female, and Male and Female)

Dart Union Pipe Couplings

Tight—Permanently

Both Faces of the Joint are Bronze; there is no deterioration. The iron parts are extra heavy; they cannot stretch or pull apart.

Another advantage of using Dart Unions is that they are easily and quickly connected, whether pipes are in or out of line.

SOLD BY ALL FIRST-CLASS SUPPLY HOUSES.

Absolutely guaranteed.

Manufactured and Guaranteed by
DART UNION COMPANY, Limited
TORONTO, CANADA

Figure 2 is a 4-in-1 fitting. It cuts out nipple and one thread at running end and nipple, elbow and two threads at the elbow end.

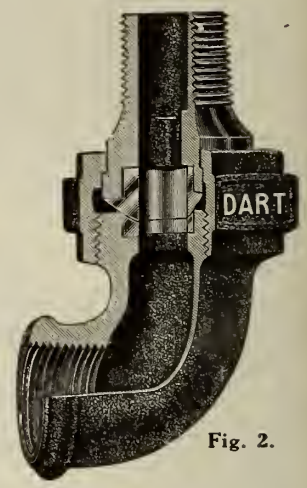


Fig. 2.

KERR GATE VALVES



I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.



BRASS GATE

THE KERR ENGINE COMPANY, LIMITED

WALKERVILLE, ONTARIO

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Beaton & Corbin Mfg. Co., Southington, Conn.
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C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
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Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

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James Morrison Brass Mfg. Co., Toronto.

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Steel & Radiation, Ltd., Toronto.
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Jenkins Bros., Ltd., Montreal.
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Full Thread at One Cut

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"Beaverette"

A Compact and Complete Tool

NO CHANGING OF DIES—NO BACKING OFF—NO LOOSE BUSHINGS. These are some of the advantages of the "Beaverette" not found in any other tools. Cuts from ⅛ to 12 inches.

One man can cut a 12-in. thread easily with our tool.

Beaver Pipe Cutters



Make a square, clean cut, and leave no burrs. There's less friction on hot water jobs and less wet steam on steam jobs when the Beaver square-end pipe cutters are used.

Manufactured by

The Borden-Canadian Co.
Toronto, Canada

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Every Sanitary Engineer

Should Make A Practice of Stocking and Selling

A Select Line of

Modern Gas Appliances

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BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized
All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

Montreal Works: Lachine, Can.

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Firms now using this system would not be without it for five times the small fee I charge.

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Think of the time and money you could save by simply referring to an up-to-date resale price list. How many times a day could you use it? Think, how much more business like it looks to your customers. You have not the time or facilities for watching the markets and making price lists. That's my business. Let me assure your profits.



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Does not mean procuring a big volume of business.

It depends on the prices you charge.

You receive no thanks for selling goods too cheap.

It's just as easy to procure a reasonable price.

I WILL GUARANTEE PROFITS

C. D. HENDERSON, P. O. Box 123, Brantford, Ont.

Send me particulars about your PRICE SERVICE:

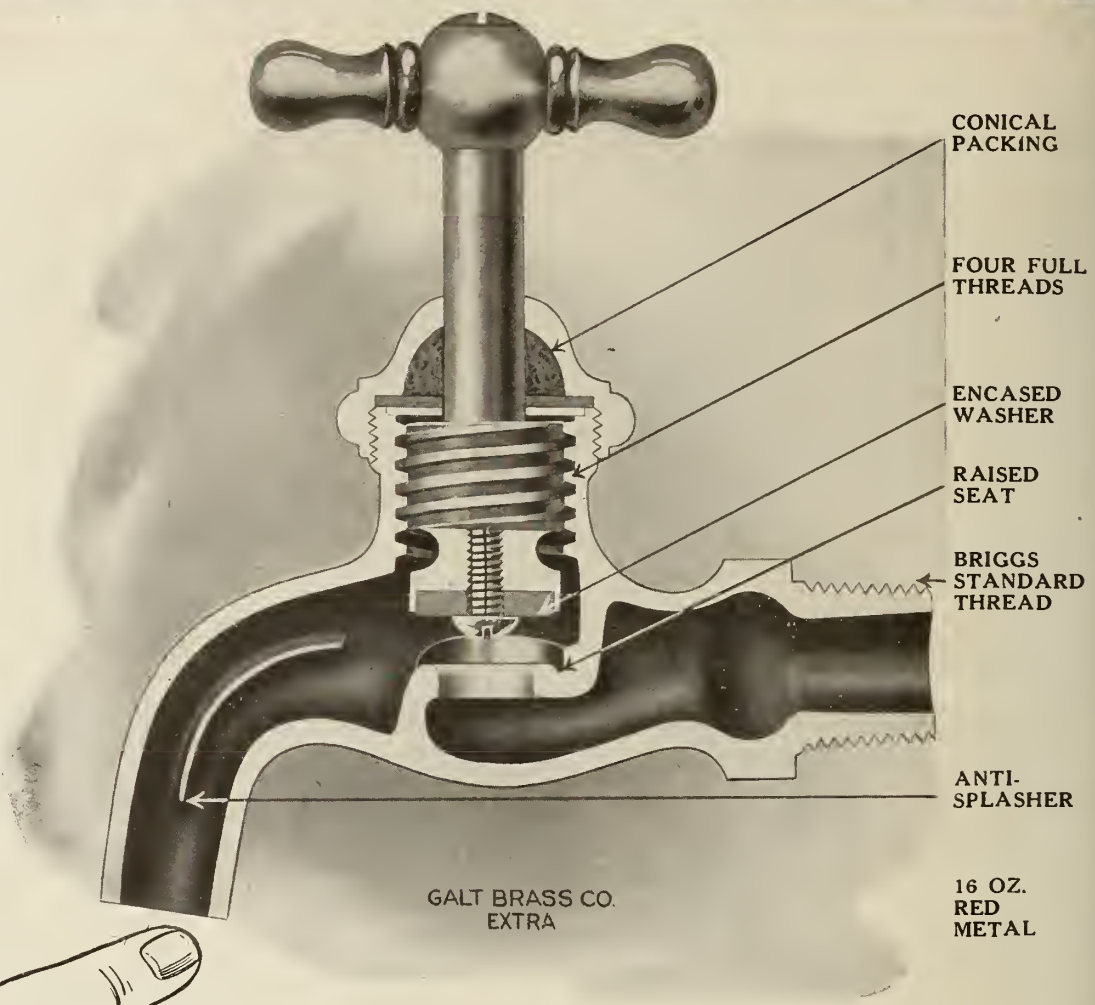
NAME.....

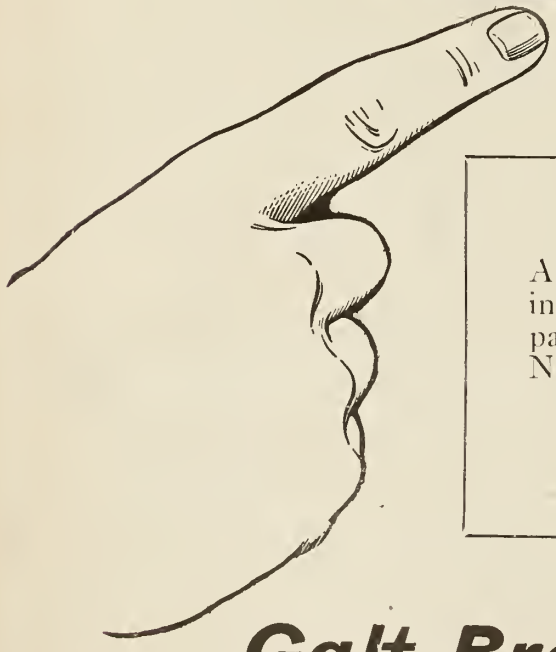
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— NO OBLIGATION — SIMPLY AN INQUIRY —

Registered **PERFECTO** Trade Mark

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, MAY 15, 1917 | No. 10

FILE COPY

EMPIRE VALVES

Quality First

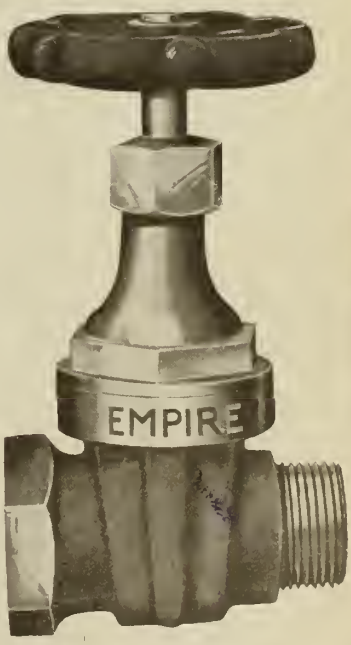
Everybody's Using Them Now!

This is just a figurative statement, as you know, but the metaphor applies to EMPIRE GATE VALVES to the full extent of its meaning—THEY ARE EVERYWHERE IN DEMAND. There is a sound reason for their popularity—SUPERIOR QUALITY AND SERVICE.

Plate A 860



Plate A 864



Increase your profits—put in a line of "EMPIRE" parts—they are standardized.

There is big business open for the aggressive sanitary and heating engineer. Act now.

Empire Gate Valves are constructed of full weight, close-grained red metal—solid, tenacious. Built for rough usage.

They are simple but efficient, and have large clear opening. Accurately threaded.

EMPIRE MANUFACTURING COMPANY, LIMITED

LONDON *TORONTO*

FILE COPY

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for **BEAVER BRAND CAST IRON ENAMEL WARE**

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

ONTARIO:
Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Quick Delivery Service

During the Spring and early Summer season, stocks frequently become depleted and rush Sorting Orders are sent to manufacturers. That is where our unequalled facilities for a quick delivery service prove very helpful to the trade. Our twenty-eight service branches make the quickest kind of service possible. If you have not proved that fact, put us to the test for anything you need in rubber.

FOR THE PLUMBING TRADE WE HAVE

Rubber Valves Bath Stoppers Basin Stoppers
Suction Cup Tank Floats Valve Packings
Twyford and Conical Connections

Write our nearest branch.

Canadian Consolidated Rubber Co. Limited

Head Office - - - Montreal

Service Branches: **Halifax, St. John, Moncton, Quebec, Ottawa, Toronto, Hamilton, Brantford, London, Kitchener, North Bay, Fort William, Winnipeg, Brandon, Regina, Saskatoon, Calgary, Edmonton, Vancouver, Victoria.**

ONE MAN DOES WORK OF TWO
WITH THE
"Jardine" and "Toledo" Pipe-Threading Tools



"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of "**JARDINE**" OR "**TOLEDO**" DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear, too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

WRITE FOR CATALOG OF COMPLETE INFORMATION.

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HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.

THE *Aylmer* 1500 ELECTRIC

After all it's FACTS *That Count.* Get this one

WATER SUPPLY SYSTEM *for* DOMESTIC SERVICE
THE STANDARD OF CANADA



The Only System Made in Canada That Will Supply FRESH WATER Direct From the Well

Mr. Sanitary Engineer, think for a minute what it will mean to your customer in those sweltering hot days to just turn the tap and get COLD, fresh water direct from the well, and not from the storage tank too warm to drink. Thing what such a customer will have to say of a system like this. And then remember that they cost no more than other so-called systems of much smaller capacity and lighter construction, which have not this feature.

THE AYLMER 1500 FRESH WATER SYSTEM

Pump capacity 150 gals. per hour. 1-6 HP Century Motor. Compare this. Tanks of various capacity. The automatic switch mounted at factory. The whole system shipped ready to set up complete. Write to-day for Bulletin S36.

The Aylmer Pump & Scale Co., Limited, Aylmer, Ont.
ESTABLISHED 1887



Plenty of room to swing good, big shovelfuls through this real **man-sized** fire door.

Pointing Out Two Points About the Burnham Boiler That Help Make It So Easy to Get Along With

TWO points. Each of which does its own full share to make the Burnham Boiler the easy-to-get-along-with boiler it is.

There's the man-sized fire door. And "man-sized" is right. The man who owns the boiler can scoop up a good, big shovelful of coal and swing it through the Burnham Boiler's fire door without the slightest danger of its bumping on the sides and spilling the coal all over the floor. Doesn't have to be an expert shot to do it, either.

The other point we spoke of, is even more important. That point is: that every operating part is right on the front of the boiler. No need for the boiler owner to walk or crawl around in back of the boiler to clean out the flues; turn the smoke-box damper or tend to anything else. He can stand in front of the boiler and tend to everything that needs tending to, without moving a step.

There are other points that help make the Burnham Boiler easy to operate. And still others that make for its economy, comfort and dependability.

Our catalog pointedly points out these points. Send for it.



Our friend is turning the smoke-box damper. And doing it from the front of the boiler. Every other operating part is on the front, too.

Lord & Burnham Co. Limited of Canada

(Boiler Department)

Royal Bank Bldg., TORONTO

Burnham Cosy Comfort Heat dB

Factory: ST. CATHARINES, ONT.

The same composition that has made "Wolverine" Packings Famous is used in

The Rounded Taper Bibb Washers

These Washers will make a tight faucet on Quick Closing Compression Faucets, or a worn or imperfect seat where a flat washer would fail.

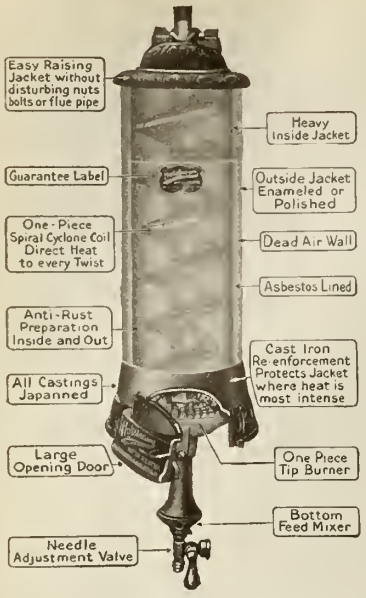
Nine sizes in stock. ***Samples sent upon request.***

CATALOG "C" SHOWS OUR LINE OF PACKINGS.

Canadian Wolverine Company, Limited

CHATHAM, ONTARIO

Quality Survives



Service—Speed—Economy

If your jobber can't supply you—write direct

THE HOTSTREAM HEATER CO.
CLEVLAND, OHIO
W. H. Cunningham, 99 Kingswood Rd., Toronto, Canadian Representative.

Isn't it a fact that YOU can buy "Water Heaters" at any old price? But did you ever stop to realize that your CUSTOMER buys the SERVICES of the heater—not the heater itself? Even if he THINKS he wants the cheapest heater made, he EXPECTS GOOD SERVICE and if he doesn't get it he BLAMES YOU. He FORGETS his only saving is in first cost, yet DEMANDS that it meet with HIS idea of a Water Heater in SERVICE, SPEED and ECONOMY.

Hotstream Heaters are built to meet YOUR CUSTOMER'S VIEWPOINT—he is the man to be ultimately satisfied!

Remember—you can't buy Creamery Butter for the price of Oleo.

Yet the price of a Hotstream is small compared to what its EXCELLENT SERVICES justify.

You owe it your business to investigate and compare Hotsream Heaters with those you are using.



Master Plumbers Know that there is No Money in Labor!

The Wallaceburg Brass & Iron Mfg. Company
WALLACEBURG, ONTARIO



THE CRANDON NO. 42 TANK TYPE THERMOSTAT

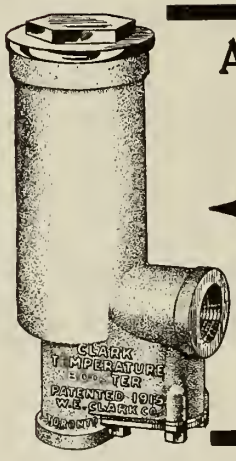
is a thoroughly reliable automatic control for hot water.

The thermostatic bar comes in direct contact with heating surface of tank or pipe, insuring perfect control.

Attractive discounts.

Write for booklet to-day.

DARLING BROS., LTD.
MONTREAL, CANADA
BRANCHES: TORONTO and WINNIPEG
Agents:
HALIFAX, ST. JOHN, CALGARY, VANCOUVER



A REAL BOOSTER AND A CANADIAN

Boosts Temperature. Boosts profits, and will build up a reputation for every one installing the Clark Temperature Booster.

W. E. CLARK, LIMITED
719 KING ST. W. TORONTO

THE TINSMITH'S HELPER AND PATTERN BOOK

By H. K. Vosburgh Revised by William Neubecker

This is a book of 135 pages, 54 plates. Epitome of mensuration. Mensuration of surfaces. Tables, Rules and Recipes. Practical Receipts, on the making of all kinds of solder.

The Most Practical "Helper" Ever Introduced Into The Tinshop.

PRICE $1.00, Postage Prepaid.

Technical Book Dopartment

MACLEAN PUBLISHING COMPANY, LIMITED
143-153 University Avenue, Toronto

JENKINS BROS.' Type "K" BRASS GATE VALVES

MADE IN CANADA

Only the WEAR and TEAR of HARD, CONTINUOUS SERVICE is the TRUE TEST of a VALVE.

EFFICIENCY, under the most exacting conditions, has PLACED and KEPT TYPE "K" GATE VALVES in thousands of up-to-the-minute POWER PLANTS.

Their design is graceful, the metal is evenly distributed so as to insure rigidity and strength, preventing distortion due to strain or shock, and are of the DOUBLE WEDGE type.

Unlike Valves with a solid wedge, the Discs in the TYPE "K" VALVE will not jam in the Valve body, for the first movement of the Spindle loosens the Discs and the guides in the body remove them from the seat-faces.

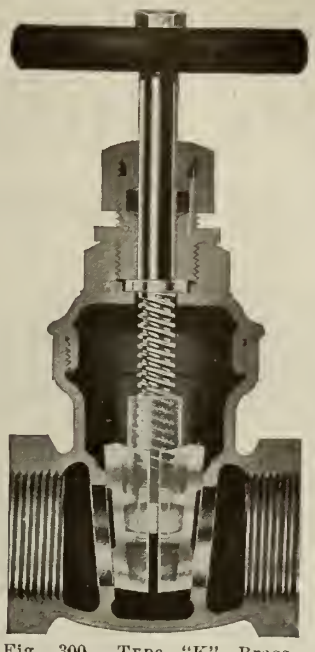


Fig. 300. Type "K" Brass Gate Valve. Screwed. (Sectional View)

TYPE "K" GATE VALVES are a "TRIED" VALVE.

In SERVICE they have PROVEN themselves to be WITHOUT an EQUAL.

They are not sold for trial or testing purposes, but to stand hard, continuous work.

GUARANTEED against defects in MATERIAL or WORKMANSHIP and in other respects carrying the usual JENKINS BROS.' GUARANTEE OF SERVICE and SATISFACTION.

Registered and approved for use in the Provinces by the Departments of Public Works.

Write for Catalogue No. 8.

JENKINS BROS., Limited

TRADE JENKINS MARK

103 St Remi Street
MONTREAL

G.M.C. WATER SYSTEMS
WITH
INVINCIBLE PUMPS



The Pump you have thought possible but never hoped to see.

One Exclusive Feature—Perfect Lubrication.

When an "Invincible Pump" leaves the factory, it will run for two years under ordinary conditions without oiling.

We furnish the Lubricant.

It is in the Great Case.

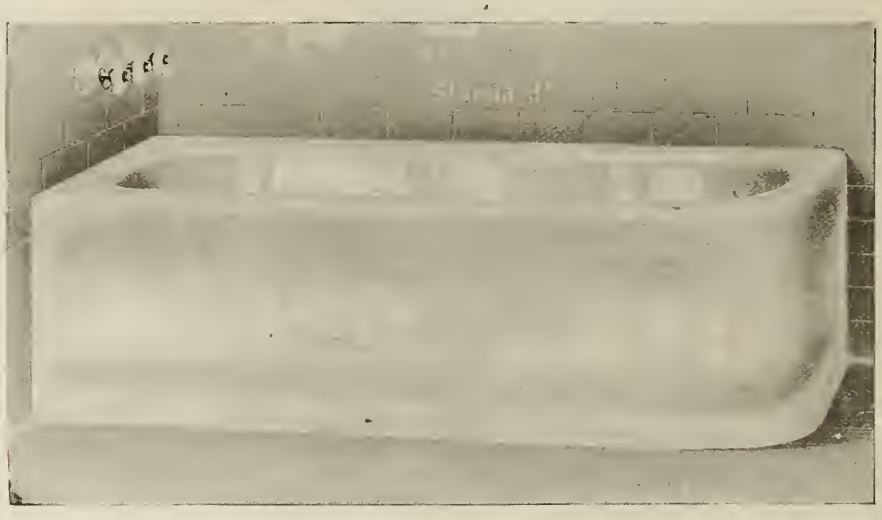
Forget It.

The General Machinery Co., Ltd.

24 MULOCK AVE., TORONTO

"Standard"
"Perfection" Built-In Baths

Made in One Piece Enamelled All Over



These Baths represent the last word in design and finish, and are made to build into Right or Left Hand Corner or into a Recess.

The "Perfection" Built-in Bath is only 17½ inches high, therefore convenient. It builds into walls and floors, the absence of all dust-collecting cracks and corners, meaning bathroom sanitation.

Made in 5 and 5½ foot sizes.

Illustrations on request.

Write the nearest dealer.

Standard Sanitary Mfg. Co.
Limited

General Office and Factory, Royce and Lansdowne Aves., Toronto, Ontario

Toronto Store:
55-59 Richmond Street East

Montreal:
4 Beaver Hall Square

Winnipeg:
76 Lombard Street

Hamilton Store:
20-28 Jackson Street West

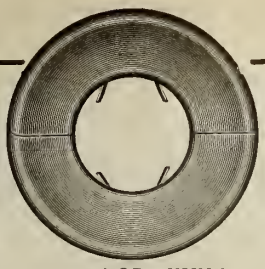
Vancouver:
202 Crown Building

"MADE IN CANADA"



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.



Gem No. 4.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

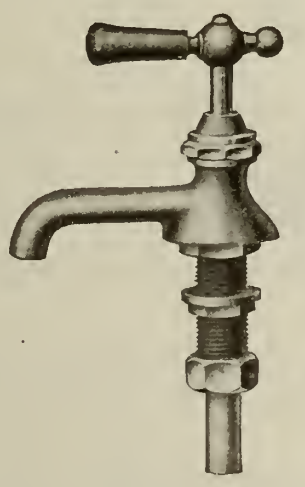
New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

Joseph Breeden & Co., Ltd.

NEW MILL WORKS

Fazeley Street, Birmingham, England



MANUFACTURERS OF

HIGH CLASS

Steam and Water Fittings



SPEAKMAN UNIT FIXTURES

(For Lavatories)

1. **Designed right.**
2. **Standardized parts made right.**
3. **Correctly assembled.**

If you saw (and visitors are welcomed) all the precautions that surround each step in the manufacture of our "Unit" fixtures (for lavatories), you would understand why they give such general satisfaction. Speakman quality is maintained in quantity production—every process watched, every part critically inspected, and every "Unit" fixture tested before leaving the factory.

The Speakman "Unit" fixture (for lavatories) enables you to install a high-grade, up-to-date combination fixture at a very moderate cost, and at the same time feel confident that you have put in a fixture that will add to your reputation as a master plumber.

The Speakman "Unit" fixtures fit almost any lavatory drilled for bi-transit waste and two faucets. Easy to install. Give splendid results. Prompt delivery from our Toronto stock.

SPEAKMAN SUPPLY AND PIPE CO.
RIVERVIEW WORKS
WILMINGTON, DELAWARE

WILMINGTON SUPERIOR SPEAKMAN QUALITY DELAWARE

THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, MAY 15, 1917 No. 10

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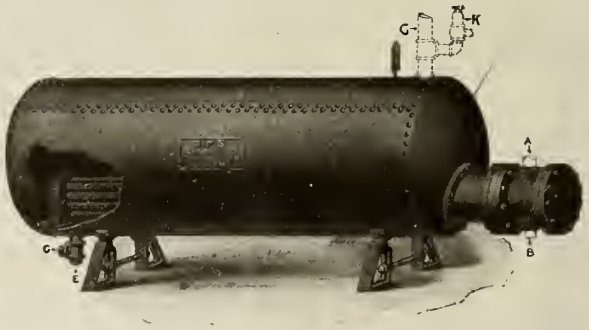
EDITORIALS

That Grafting Yarn Again—Necessity Calls.

I cut delivered "as on July 26. 1917

SIMS

Hot Water Generators, Circulating Convertors and Storage Heaters are Standard.



The "B-H" Type Storage Heater shown here, is economical, efficient, of reasonable cost, easy to clean and repair. Can be used for summer service in connection with tank heater or garbage burner.

Nearly every prominent Institution, and many Hotels and Restaurants in Canada are equipped with "Sims."

Canadian Selling Agents:

The Mason Regulator & Engineering Company, Limited

Successors to

H. L. Peiler & Company, 380 James Street, Montreal; 311 Kent Building, Toronto

Works: 960 St. Paul Street West, Montreal

WE WISH TO INFORM ALL OUR CUSTOMERS

THAT IN SPITE OF THE FACT THAT OUR PLANT WAS TOTALLY

DESTROYED BY FIRE

ON THE NIGHT OF 11TH, WE HAVE SECURED OTHER PREMISES AND WILL BE IN A POSITION TO

MAKE PROMPT DELIVERIES

IN A FEW DAYS

VITRO NO-TROUBLE TANKS ARE MADE IN WHITE, OAK AND MAHOGANY FINISHES

HANDLED BY EVERY JOBBER FROM COAST TO COAST

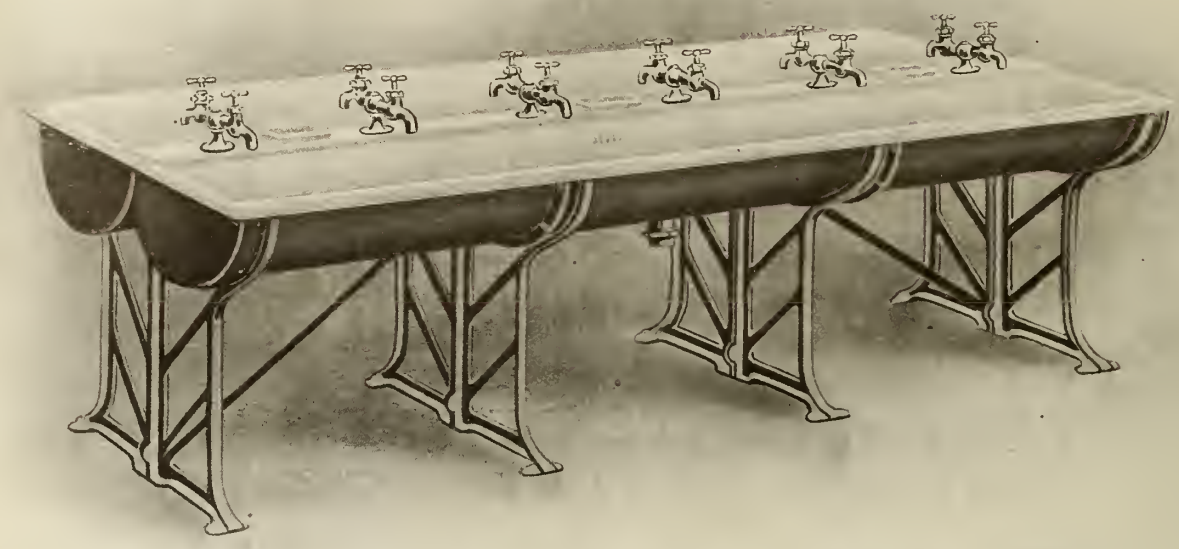
AGENCIES:

QUEBEC PROVINCE: Mechanics Supply Company, Limited, Quebec, Que.

MARITIME PROVINCES: The Jas. Robertson Company, Limited, St. John, N.B.

Cluff Manufacturing Company, Limited

81-111 STERLING ROAD, TORONTO, ONTARIO



FACTORY SANITATION

Sanitary Wash Sinks in a Factory are a great convenience.

They are not expensive, and as a convenience, save their own value many times in a year, besides inducing habits of cleanliness among the employees.

Plumbers can get good business by pushing the sale of factory wash sinks. Many owners would install them if they know their advantages and just where they could get them.

The Plumber can tell them and we will be glad to help the sale by furnishing illustrations and descriptive matter free of charge. Made in 14 different designs—all lengths from 5 to 30 feet.

Port Hope Sanitary Mfg. Co., Limited

HEAD OFFICE: ROYAL BANK BUILDING, TORONTO

TORONTO SHOW ROOMS
119 King St. East

MONTREAL SHOWROOMS
234 Beaver Hall Hill
Montreal

THE SANITARY ENGINEER

VOL. XI MAY 15, 1917 No. 10

An Address on Bookkeeping

Given Before the Toronto Society of Sanitary and Heating Engineers—Some Splendid Examples, Simple Yet Necessary, to the Success of all Businesses.

By D. MacLulich, accountant, Keiths, Limited, Toronto.

Continued from May 1st issue

I WILL now describe briefly and illustrate the modern journal which is what I might call an "omnibus" book into which are gathered day by day for easy transference to the ledger or final book of record all such transactions as do not properly belong to the three other day books just mentioned.

The following is a suggested ruling and the entries illustrate the opening entries of a business desirous of starting a system of double entry accounts.

You will notice I show separate headings for three separate ledgers, but while for a moderate-sized business one ledger might be sufficient, it will be found most convenient to give each class of accounts a separate section of the Ledger, thus the first portion of the ledger, say pages 1-100 would be devoted to the private accounts of the business, such as "Capital a/c, Profit and Loss a/c, and the various asset accounts, such as Plant, Tools, etc.



D. MacLULICH,
Accountant, Keiths, Ltd., Toronto.

The word asset means "things that you own," while liabilities are things that "you owe." The reason capital account is treated always as a liability is because the proprietor must always consider himself as apart from the business; he must mentally, so to speak, stand aside and look upon the business as an entity in itself and therefore as capital account furnished the money to carry on the business or to go back to our axiom, "conferred the benefit," it is credited and the business eventually must pay it back, and in the case of an individual company, capital account will restore it to the proprietor, or, in the case of a limited liability corporation, to the shareholders.

The second portion of the ledger—pages say 101-350, can be devoted to your sales accounts or debtors and the remaining portion, 351-750 to your purchase accounts or creditors.

The journal might be ruled to show only two columns, one debit and the other credit, and it would work quite satisfactorily in a small business, but by dividing it up to show a debit and credit column for each separate ledger or sec-

JOURNAL APRIL 1917

DATE		FOL	PRIVATE LEDGER DR	PRIVATE LEDGER CR	SALES LEDGER DR	SALES LEDGER CR	PURCHASE LEDGER DR	PURCHASE LEDGER CR
apr 15	Plant and Equipment.	4	6000 00					
" "	Tools	6	400 00					
" "	Horse and Wagon	10	250 00					
" "	Merchandise	11	1500 00		3500 00			
" "	Accounts Receivable			7000 00				
" "	Cash		750 00					
" "	To Capital a/c	1						
" "	Being assets on hand							
" "	this date of inventory							
" "								
" "	Capital a/c	1	1250 00					
" "	To a/cs Payable							1250 00
" "	as per schedule of a/cs							
" "	payable at this date							
" "								
apr 20	Bad and doubtful debts	20	150 00			150 00		
" "	To John Brown	122						
" "	Reported uncollectable							
" "	by Duns							
" "								
apr 22	Dominion Foundry	320					280 00	
" "	To mdse a/c	11		280 00				
" "	one bath returned by							
" "	them that was chipped & defective							
" "	B Smith						250 00	
	To B Smith							
	Contra a/c					250 00		

tion of the ledger, it facilitates the finding of any clerical error if such occur, and even the best of us are not infallible. Therefore, I have used this ruling, but you do not necessarily have to have it, it is a great convenience at balancing times, but not an essential.

The entries in the journal are posted to the respective accounts designated in the ledgers or portion of the ledger affected and shown and the folio number entered against it to show that it has been so posted and as a ready means of reference. Every entry you will notice is posted to the debit of some account in the ledger and to the credit of another account, thus preserving the double entry system. In the case of capital account the total of various debit entries is posted to the credit of capital account, the whole being equal to its parts; this saves clerical work and is resorted to on all occasions where it is feasible.

Passing on from the journal to the cash book, also illustrated, you will notice I have preserved the same columnar divisions as in the journal, keeping the entries separate for the different sections of the ledger to facilitate balancing the books, but again this is optional on the one hand or can be considerably enlarged upon on the other.

CASH BOOK APRIL 1917 Cr

DATE	NAME	FOL	PURCHASE LEDGER	PRIVATE LEDGER	DISCOUNTS AND INTEREST	BANK ACCOUNT
Apr 17	United Hardware Co	395	95 00		1 90	93 10
" "	Builder's Supply Co	358	6 00			6 00
" "	Dominion Foundry	365	225 00		4 50	221 50
" "	Rent for April	50		35 00		35 00
" 21	Wages Productive	30		325 00		
" "	" Non-productive	50		55 00		380 00
" 23	Petty Cash	50		10 00		10 00
	ETC. ETC					
			950 00	875 00	9 75	1815 25
	Balance as per Cash book				CREDIT TO FOLIO 50	
		23	156 00			
	Balance as per Bank Statement		203 00			
	Less Cheques Outstanding					
	Beal $20.00					
	Foy 10.00					
	McBeth 15.00					
	Jones 2.00		47 00			
			156 00			

Deposit All Cash In Bank

Right here let me impress upon everyone of you most earnestly the folly of not depositing, daily, or every few days all cash collected, in the bank. It is the greatest mistake to keep cash collected in the office and use it as a fund out of which to pay small accounts; in my experience, which has been rather varied, I have never come across an instance where this bad method was followed which did not fail, to use a slang expression, in balling up the accounts hopelessly and furthermore there is absolutely no excuse for it as it always entails more work and worry than the proper method. As a corrollary to this, never pay any account except by cheque, the very slight additional expense this would entail upon you by reason of the stamp tax will be saved many times over in a variety of ways. You will, of course, need to keep some petty cash in the office, according to the size of your business, but you should draw a cheque for $5, $10 or $15, as the case may be, entering it in the private ledger column of your cash book and from there charging it to "expense a/c" in the private ledger, and at the same time keep a memorandum book called the "petty cash" book, in which you will keep a record of how this amount was disbursed, and when you have exhausted this petty cash fund you will draw another cheque, treating it in the same manner ad infinitum. There are several other methods of treating petty cash that are more elaborate and in many cases more satisfactory, but we would not have the time to take them up here.

On the debit or left hand side of the cash book you will enter all cash received, being sure always to insert the dates. In the first column headed "sales ledger," you will enter such amounts as you receive from your trade customers and whose accounts appear in the sales section of your ledger and from there you will post them to the credit or right hand side of your customers' account. If as in the case of B. Smith he pays an account of $50.00, taking 2% cash discount, giving you a cheque for $49.00, you will enter the full amount of $50.00 in the first column, showing the $1.00 discount in the discount column. If as in the case of McKay & Sons the bank charge you for collection on an out-of-town cheque, you will show the full amount in the first column and the bank charge or deduction in the discount column.

When you make your deposit in the bank, it should agree when the discount column is added to it with the amounts shown in the other columns, thus the total of the last two columns on the debit side agree with the combined totals of the other columns; the same principle being followed out on the other or credit side of the cash book only in this case it will be you who will be taking the discounts off the bills you are paying and such bills or rather cheques will be shown in full in the first column of the credit side and posted to the debit side of your creditor's account in the Purchase Ledger section of the Ledger. The cash book should be balanced each month and checked to see that it agrees with the bank statement, all outstanding cheques being noted. The difference between the two bank columns will in this case represent your cash balance and should be carried over to open your cash account for the next month. The total of the discount columns for the month should be posted each month, that on the debit side to the debit of expense account in the private ledger, and that on the credit side to the credit of expense account.

Daily Sales Book

The sales day book contains simply a daily record of the sales and each separate entry should be full and complete so that at any future time should you have to refer back to any entry, you will not have to rely upon your memory to fill in any of the details of the transaction. Each entry is posted from the sales day book to the debit side of the particular customer's account in the ledger to whom the sale was made and the double entry is completed by posting to the credit of an account styled "Sales Account" in the private ledger; but instead of making a great number of entries during the course of each month to the credit side of "sales account," we wait until the end of the month and in one entry post the total of the sales book to the credit of sales account. Of course, the sales book can be divided into any number of columns classifying the sales under different headings or departments if you require a little more elaborate system showing what the total sales are in certain classes of goods or if you wish a record of the profit and loss of the various departments of your business.

Loose-Leaf Invoice Forms

Instead of having a bound book in which to record the sales it simplifies the work immensely if you have your invoice forms made in duplicate and perforated so that you can take a carbon copy, mailing the original to your customer and filing the duplicate in the binder. You will then post from the binder to the ledger, marking the copy invoice with the ledger folio to which it was posted and as each invoice should bear a consecutive number you will enter the invoice number in the folio column of the ledger as a means of ready reference in case you want to look up the details of your customer's account at a future date. If you use this latter method which saves a great deal of labor, it will be advisable, as it is neces-

Dr APRIL 1917 CASH BOOK

Date	Name	Fol	Sales Ledger	Private Ledger	Discount Exchange	Bank Account
Apr 15	Balance on hand	J 1		7 5 0 00		7 5 0 00
" 20	John Jones	123	2 0 00			
" "	B Smith	176	5 0 00		1 00	
" 23	Mc Kay & Sons	146	2 5 0 00		35	
" "	Expense % Refund Liability Insurance	50		2 5 00		3 4 3 65
	ETC. ETC					
			1 2 0 0 00	7 7 5 00	3 75	1 9 7 1 25
					Dr TO Fol 10 50	

sary to post the total of your month's invoices to the credit of sales account in the private ledger as before explained, to place in the binder at the end of each month's invoices a sheet of paper which we will call the "Abstract," on which you will merely enter the invoice number and the amount, showing no names or details commencing with the first invoice in that particular month and finishing with last invoice and by glancing down this list which would only take you a few minutes to compile, you can see in a moment if any invoice has been inadvertently omitted, then add up the amount column of this abstract sheet and post the total credit of sales account in private ledger.

Daily Purchase Book

Our next and last book that I want to describe to you is the Purchase Book.

I do not consider it necessary to enter in this book the full details of all invoices you receive from your creditors for the goods you purchase, that used to be the custom years ago, but it involves a vast amount of unnecessary labor; it will be sufficient if you put into operation a good system of filing your purchase invoices where you can readily look them up in case you need to refer to them. You can purchase from any stationers for a few cents filing transfer cases where you can file your invoices alphabetically.

Posting Invoice

I would suggest your keeping your purchase invoices till the end of the month, storing them meantime alphabetically in a filing case by themselves to ensure their not being left around loose and lost, then entering them in your purchase day book after which they will be transferred to the permanent transfer filing case mentioned above. You will by this means, again, save yourself a great deal of detail postings to the purchase ledger. A further labor saving device will be to have your purchase book divided up into several columns in which you can enter your various classes of purchases as illustrated.

By the illustration you will see that instead of having three separate postings to make to J. Robertson's account we get away with only one entry for our total purchases from him for the month. It may be that the goods purchased entered into our jobbing or contract work and were consequently resold by us in the original or else some altered form in which case we would enter them in our merchandise column or it may be that the goods purchased were in the nature of an expense such as telephone service, general cartage account, printing and stationery, etc., in which case we would enter them in the expense column, or if for tools in the "tool" column. I have then left several spare columns which you may find it advisable to give headings to or you can head one column "sundries," and gather into that any items that only occur infrequently, such as "plant."

Now for the posting of this book, you post the amounts shown in the "total" column to the credit or right hand side of your various creditors' accounts in your purchase ledger and to complete the double entry you post to the debit side of your private ledger the monthly totals of the various columns to the merchandise account, expense account, and tools account, and in detail the sundries column to the debit of the accounts specified.

The record of the purchase invoices could also be kept on what is called a voucher system, and this again could be interwoven with an accurate contract cost system, but it would be impossible to deal with these methods this evening.

(Continued in next issue.)

PURCHASE DAY BOOK

Date	Name	Fol	Invoice	Total	Merchandise	Expenses	Tools	Sundries	Fol	
Apr 16	J Robertson		2 0 50							
" 18	" "		1 0 00							
" 21	" "	410	3 50	3 6 00	3 6 00					
" 30	Bell Telephone Co	322		5 0 00		5 0 00				
" 30	Toronto Cartage Co	485		1 2 00		1 2 00				
" 17	Union Press Co		2 1 75							
" 21	" " "		3 25							
" "	" " "		4 50							
" 25	" " "	470	1 7 50	4 7 00	4 2 50		4 50			
" 26	Wardell Machinery Co	485	1 2 5 00					1 2 5 00	4	Plant.

Ontario Society Executive Meet

The Sixth Annual Meeting of the Ontario Society Executive Met on Friday, April 27, 1917, at Their Permanent Quarters, 22 College St., Toronto.

PRESIDENT F. R. MAXWELL called the meeting to order, and in a few remarks, outlined the work before the members, explaining the action taken by the directors in calling for a referendum vote of the members, as to whether an annual meeting of the society be held this year, or a meeting of the executive committee in its place; also whether the dues be decreased or remain as they were. The result was the uniting of the annual meeting of the society and the executive committee into one session for 1917. The members also decided that the dues should remain as they were.

Secretary Garrett F. Frankland read the roll, which showed the following members in attendance:—

Directors

President, Frank R. Maxwell.
Vice-President, Fred H. Gentle.
Treasurer, Thomas M. Maxwell.
Secretary, Garrett F. Frankland.

Honorary Directors

William Mansell, Lewis LeGrow, Geo. Clapperton, Ernest H. Russell, and Albert E. Gibbons.

Trustees

Harry Mahoney, and Ernest H. Russell.

Auditors

Frederick Smith, and Thomas H. Ferguson.

Ben Noble, chairman, Heating Committee.

George E. B. Grinyer, chairman, Educational Committee.

Vice-President

Clove R. Myers, Canadian Society.
Harry J. Peter, Stratford.

London Committee

John Eggett, Harry Aked, and Tom Rich.



John Wright, Toronto.



GARRET F. FRANKLAND,
Vice-Pres. Canadian Soc. and Secty. Ontario Soc. D. S. & H Engrs.

Toronto Committee

Past President, Thomas B. Smyth.
Vice-President, Thomas H. Ferguson.
John Wright, chairman, Sanitary Committee.
Robert J. Shannon, chairman, Publicity Committee.

President F. R. Maxwell announced that the reports would be taken up later, while the correspondence would be attended to at this point.

Letters from Absent Officers

Secretary Frankland read the following communications which were received and ordered to be filed, on motion of Wm. Mansell and George Grinyer.

President A. Charette, Canadian Society, Montreal, stating he could not be present, and tendering his own and the Montreal members' good wishes for the success of this meeting.

Secretary-Treasurer Lawrence J. Conroy, Canadian Society, Montreal, in which receipt of invitation for the executive officers of the Canadian Society to attend this meeting was acknowledged.

Chairman Michael A. Brian, and Secretary Charles E. Paddon, of the Plumbers' Division, of Windsor, of the Builders' and Contractors' Association of Essex County, in which success was hoped

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Financial Statement of Ontario Society of Sanitary Engineers for 1916, Year Ending January 31, 1917.

RECEIPTS

1916	
Feb. 1—By bank balance	$ 5.89
Mar. 22—By dues received	10.00
Mar. 28—By dues received	10.00
Apr. 7—By dues received	10.00
Apr. 12—By dues received	10.00
June 17—By expenses paid	2.00
June 28—By dues received	260.00
July 3—By dues received	9.00
July 13—By dues received	20.00
July 24—By dues received	100.00
Aug. 2—By dues received	10.00
Aug. 24—By dues received	10.00
Aug. 31—By dues received	20.00
Sept. 18—By dues received	20.00
Sept. 22—By dues received	65.00
Oct. 30—By dues received	140.00
Oct. 31—By dues received	23.50
Total receipts	$725.39
	$725.39

DISBURSEMENTS

1916	
Feb. 1—To annual Govt. fee	$ 1.00
June 20—To D. C. Exchange com...	11.00
June 20—To G. F. Frankland ex...	36.00
June 28—To Wm. Skelly, refund....	10.00
June 29—To G. F. Frankland, salary	100.00
July 25—To Can. Soc. Domestic Sanitary and Heating Engrs. P.C. for 1916	74.00
July 25—To E. H. Russell, Annual Meeting expenses	47.00
July 25—To G. F. Frankland, back salary	160.00
July 25—To G. F .Frankland, exp...	34.75
Dec. 7—To G. F. Frankland, exp...	7.64
Dec. 7—To G. F. Frankland, exp....	25.00
Dec. 22—To G. F. Frankland, exp...	19.00
Total disbursements	$525.39
Balance in Bank	200.00
	$725.39

NOTE.—The Receipts were made up as follows:

1915 balance	$ 5.89
Back dues	110.00
1916 Dues	607.50
Expenses paid	2.00

ASSETS

Bank balance	$200.00
Office furniture, charts, records, stationery and books	100.00
Dues unpaid for 1916 (7 members)	70.00
Dues unpaid, 1915 and 1916 (11 members)	220.00
Dues in arrears 3 years (6 members)	210.00
	$800.00

LIABILITIES

Special loan, from Endowment Fund	$100.00
Special loan, from members	160.00
	$260.00

Assets	$800.00
Liabilities	260.00
	$540.00

THOMAS M. MAXWELL,
Treasurer

for this meeting, and approval expressed for the Society's efforts.

The Brantford Plumbing Club, T. J. Minnes, President, and H. E. White, Sec-Treas., in which was expressed the best wishes for this meeting, and confidence in the outcome of same, with the assurance of their co-operation.

H. Hass, of M. Weichel & Son, Limited, Waterloo, in which he regretted his inability to assist at this time, on account of the death of his wife.

A motion of condolence was passed by the executive for Mr. Hass in his bereavement.

H. S. Brown, Brockville; Geo. E. B. Grinyer, Guelph; E. H. Russell, London; Clove R. Myers, Stratford, each of whom assured the support of their locals to the society and its efforts on this occasion.

New Members

The following applications for membership, as received by the Toronto Committee, were passed upon satisfactorily, on motion of Fred H. Gentle and Wm. Mansell, certificates and constitutions being granted as follows:—

No. 221, Walter Bros., 601 Lansdowne Ave., Toronto; No. 222, Locke Bros, 284 Dupont street, Toronto; No. 223, A. W. Wilson, 111 Robert street, Toronto; No. 224, Hearn & Lillie, 311 Roncesvalles ave., Toronto; No. 225, Fred Armstrong Co., Limited, 273 Queen street West, Toronto.

Financial Statement

The financial statement of the society, ending January 31, 1917, was then read



H. Mahoney, Guelph.

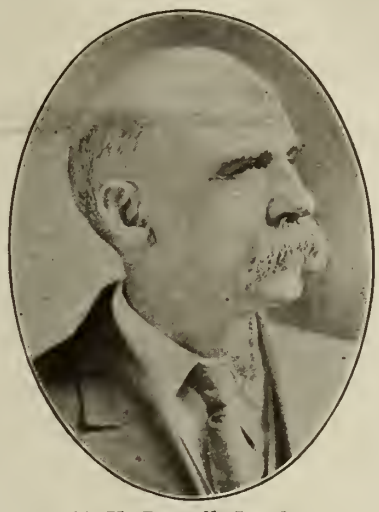
by Secretary Frankland, as shown below, same being received on motion of Wm. Mansell and George Clapperton, and to be handed to auditors for report. President Maxwell appointed Thomas H. Ferguson to assist Auditor Fred Smith in the absence of the other auditors, Treasurer Thomas Maxwell to assist them.

The Arbitration Committee's report of Chairman H. S. Brown, was read by Secretary Frankland, and on motion of Robert J. Shannon and George E. B. Grinyer, was received:—

Arbitration Committee Report

Brockville, April 12, 1917.

Gentlemen,—I wish to say, as chairman of the Arbitration Committee of the Ontario Society of Domestic Sanitary



E. H. Russell, London.

and Heating Engineers, that I have no report to make, other than that I am glad to say that the past year there has been nothing to come up for arbitration, and that as far as I know, everything has gone on smoothly, and I hope it will continue so.

Yours truly,
H. S. BROWN,
Chairman of Arbitration Committee.

The Apprentice Committee's report of Chairman Henry E. White, was read by Secretary Frankland, and on motion of John Wright and Tom Smyth, was received:—

Apprenticeship Committee Report

Brantford, April 25, 1917.

Gentlemen,—As chairman of the Apprenticeship Committee for the past year, I regret exceedingly that I have very little to report on in his behalf. I might mention to you that this is war time, therefore he has ceased to exist in my section, though I sincerely hope that upon the expiration of the war, greater attention will be given to this most important branch of our craft.

I beg to commend the action being taken by the Toronto Committee for Apprentices, in the Joint Examining Board of Plumbers' and Steamfitters' apprentices being operated there, explanation of which was published in the SANITARY ENGINEER, some time ago, by Secretary Frankland, who also acts in the capacity of secretary for that Board.

Yours truly,
H. E. WHITE,
Chairman, Apprenticeship Committee.

The Educational Committee's report of Chairman George E. B. Grinyer, was read by Secretary Frankland, and on motion of George Clapperton and Harry J. Peter, same was received, and ordered to be printed and sent to each member.

EDUCATIONAL COMMITTEE'S REPORT

To the Directors of the Ontario Society of Domestic Sanitary Engineers,

Toronto, Ont.

Gentlemen:—

Owing to my time being completely taken up with the re-organization of our company, it has been utterly impossible to find the time to put on the report that should be necessary on this occasion, nevertheless, I will endeavor to give a few items that will be beneficial to the members of our craft, providing they are put into practice.

Bookkeeping

A proper system of bookkeeping is absolutely necessary. Pay attention to your books; in them you can read the road to success or failure. Loose credit is bad business, it has shipwrecked many a promising business man. Most of us have too much money on our books, and in consequence are always hard up, borrowing to our limit, and unable to buy profitably. We must study our business, and in doing that we must keep our eyes open, and strenuous effort must be put forth in the collecting of our accounts. A man demands as much credit as he gives—the more he gives, the more he needs. Our failing to collect accounts promptly comes from the fear of losing customers; for we feel that credit is the customer's right, and not his privilege, and that the slow man will be offended if he is pressed. It is easy to forget that the interest on tied-up money too often offsets the profit on the sales. Right here may I suggest: Divide your accounts into old and new, and go after the old ones until there are none. The money we would get in would be better than borrowing at interest with a chance of a percentage of our accounts going bad. It is the usual case that we give as much credit



L Legrow, Toronto.

as our customer can get. Our aim should be to reverse the order. Most slow-pay customers will invariably try to stall you off, but it is a poor business that cannot combine tact and backbone and talk to them frankly and firmly.

Overhead

It is very essential that we keep before us the cost of doing business—such items as: Owner's Salary, Rent, Postage, Insurance, Interest on Stock, Taxes, Telephone Tolls and Rentals, Advertising, Printing,

Office Expense, Workmen's Compensation Tax, Coal, Gas and Electric Light and Power, Delivery, Car Fare, Depreciation on Stock and Tools, Legal Expenses, Bad Debts Losses by Theft, Donations, Trade Periodicals, Stockkeeper's Salary, Association Dues, Shop Time, Bonuses Labor, Replacing Defective Materials, Travelling expenses, Auditing, general and Sundries Expense. No matter how you hate detail work, get it down on paper, and look the matter squarely in the face.

Purchasing

A person must learn to buy right, and always buy in quantities when you can, and get the very best prices that are going,



H. Hicks, Toronto.

as prices are dependent on quantity. Also be constantly converting your stock into cash.

Estimating

It is very important that a proper system of estimating be kept, making sure that we include the cost of operating before profit is figured. No matter how small or large the business, a trial balance should be arranged each month to show the true condition of your affairs, and how much money has been made. It is just as important to do this as it is to draw your salary each week or month.

I am doubtful if, in the past, the majority of our plumbing and heating contractors have taken the time to do this and possibly, after reading this, many will think it unnecessary even now, and in this case, there is only one remedy: That the Government intervene and insist that every one starting in business has the necessary qualifications in financial matters, as well as being practical and qualified in the mechanical end.

GEO. E. B. PRINGLE,
Chairman of the Educational Committee

The Trustees' report, as submitted by Trustee Ernest H. Russell, of London, was next read by Secretary Frankland, and was received on motion of Harry Mahoney and Harry Peter.

Trustees' Report

London, Ont., April 23, 1917.

Gentlemen,—As trustees of the Endowment Fund of the Ontario Society of Domestic Sanitary and Heating Engineers, associated with Trustee Harry Mahoney, of Guelph, I have nothing further to report than to repeat our report of last year, and to say that our bank book will be on hand, and that further donations to our Endowment Fund will be most welcome, at this time or at any future time the members might wish to make same. I wish to again draw the members' attention to Form of Bequest that appears in their constitution as insert page 21. To perpetuate this society the endowment fund was created, and if each member will only do his part, the Ontario Society will go on through time with their names ever before it.

I would also suggest that an honor roll of those contributing to the Endowment Fund, be secured and placed in the head office of the society as a perpetual acknowledgment of the benefactor.

"The endowment fund of the Ontario Society came into existence from a sincere appreciation of the efforts put forth by William Mansell, E. L. Legrow, F. R. Maxwell, G. F. Frankland, R. C. Shannon, in founding and incorporating the Society in September of the year 1911.

"The adoption of the idea as a means of perpetuating the above Society at the annual convention, held in Toronto, March, 1913. The first donation was announced at the annual convention in Toronto, 1914, and trustees appointed. The hope is that the fund will grow by gifts, by bequests and donations, the principal being invested and the interest being used solely for the purpose of forming new local bodies, thereby adding a continual infusion of new blood to the Society, and thereby insuring perpetuity.

"Dec. 28, 1915, at a meeting held in Toronto and called to consider how money could be found to pay current bills of the Ontario Society, at the request of William Mansell, C. Clapperton, F. R. Maxwell, L. Legrow, and G. F. Frankland, and agreed to by E. H. Russell and H. Mahoney, B. Noble and J. Eggett, all being present except the last two, a cheque for $100 was drawn on the trust fund in favor of the Society, the same to be returned, with interest, as soon as the Society is in funds.

"Sincerely submitted by
"Yours very truly,
"Ernest H. Russell,
"Harry Mahoney,
"Trustees."

The following is a form of bequest, to be used by any person wishing to subscribe to The Endowment Fund of The Ontario Society of Domestic Sanitary and HeatingEngineers, that the Society may become a perpetual organization :—

"FORM OF BEQUEST."

I give and bequeath to The Ontario Society of Domestic Sanitary and Heating Engineers, a Corporation established by law in the Province of Ontario, the sum of

.....*dollars*

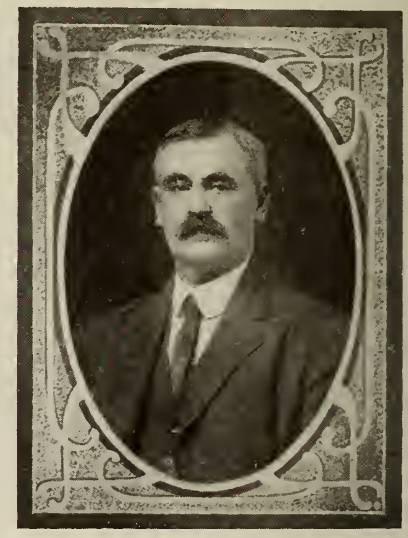
Signature .....

.....

..... *19*

21

The Directors' report was next taken up, it being decided upon motion of Wm. Mansell and Thomas Ferguson that same be acted upon, clause by clause, as received. Secretary Frankland then read the report, clause by clause, the following action being taken, in accordance



Angus McDonald, Stratford.

with the numbers shown opposite each clause:—

Directors' Report of the Sixth Annual Meeting of the General Executive the Ontario Society of Domestic Sanitary and Heating Engineers.

Toronto, April 27, 1917.

Gentlemen:—Your Directors for the past year have much pleasure in presenting, for your consideration, the following report of the numerous matters that have been taken up in the interests of the society and the craft as a whole, during that time.

We deplore the existing state of conditions that made it necessary to declare our annual meeting off for this year, but from an economic stand, it was justified, especially as the majority of the members in the referendum vote taken in March, declared themselves as opposed to an annual meeting for 1917.

Clause One.—The calling of this general meeting of Executive Committee, which will take the place of our annual meeting for this year was approved of by the members in the referendum taken on March 3rd.

Clause Two.—The annual dues for 1917, as decided by your directors after receiving the opinions of the members, and considering the best interests of the society will be held this year, but this will naturally not make any difference as far as our per capita is concerned, because the work will still be carried on by the officers, and finances are required for same.

Clause 4.—The finances of the society show improvement from the standpoint of balance on hand, as against accounts out standing, and while this condition is to be commended nevertheless your directors feel that until the entire membership realize the necessity of meeting their obligations to the society, it will be impossible to carry out the business of the society, as it rightfully requires. Because without

revenue to take care of our needful expenses, our advancement depends largely on the activities and interest shown by the individual members. Our present favorable financial condition being caused by curtailment of secretary's salary and encroachment in every way possible, where outlay was essential to the society's credit.

The outstanding dues have received our most earnest attention, and several claims have been placed in solicitors' hands for collection, while this action has resulted in most cases as being sufficient, in one case court action has resulted from the member refusing to recognize our right of claim for dues owing. This case resulted in a favorable verdict for the society and the rights of our claim was sustained by the Court, stating that any person agreeing to our conditions of membership, thereby makes himself liable to the society for his dues, unless he takes the necessary steps of withdrawal as provided for in the constitution and then only upon his payment of his dues to date. Your valued opinion is desired by the directors as to the further action being taken along this line.

Clause Five.—The selection of Toronto for the annual place of meeting as approved of at London last year is a question that the members have several times taken up, and your directors believe that it is the logical point for meetings of the Ontario society, also that directors and secretary should be located at this point is essential. Your directors believe that at least one of the directors should be chosen from an outside point to equalize the representation of the society's members on the Board of Directors.

Clause Six.—The Provincial Health Board have been requested to further the matter of compiling the plumbing code for the Province, we having received reply from Dr. J. W. S. McCullough, chief officer of health, that an expert has been working on this subject for several months, and that nis report is expected in a short time. We might say that upon taking this matter up with Sanitary Engineer Dallyn of the Provincial Board of Health, he gave as his opinion, the use of tile pipe for drains under buildings, as being most favorable material for use in drain work.

Your directors feel that action should be taken at once, to refute this contention, and every local throughout the Province should place their view on this matter before the Provincial Board of Health.

Clause Seven.—An act respecting steam boilers, has been under consideration by the Provincial authorities, under Dr. W. A. Riddell, Superintendent of the Trades and Labor Branch of the Public Works Department. Mr. D. M. Metcalf, chief inspector of steam boilers, has drafted the act, and it provides for a Board of Boiler Inspection.

This Board shall be composed of the chief inspector, who shall be chairman; one member representing the power boiler manufacturing interests; one member representing the boiler using interests; one member a representative of insurance interests; one member a representative of manufacturers of boilers used for heating purposes only; one member who shall be an operating engineer, and one member an inspector of the department, who shall act as secretary of the Board.

Your directors have requested the addition of one of our members on this Board as those who take an active part in the installation of boilers.

Mr. D. M. Medcalf, chief inspector of steam boilers, approved of our request, and referred our communication to Dr. Riddell, who informed us that when the time comes for considering the act, he shall give our suggestion careful consideration. Our Mr. Mansell attended a meeting of those interested in this act, and we expect that at an early date, some further action will be taken in the matter.

Clause Eight.—The Workmen's Compensation Act, has had several amendments and additions made to it at the recent Assembly of the Legislature. These items are of the utmost importance to our craft, especially that one referring to medical aid. Your directors favored this to be taken care of by the Compensation Board direct, which has been the method adopted, and will, as we think, result in a satisfactory manner, on all sick or accident claims.

The Compensation Board has under consideration, the question of assessing those individuals in each group, in accordance to the extra liability they incur. This will be of vast good in rightfully placing the burden of any excess compensation on those who incur same, and would not result in all the group being burdened for extraordinary accidents that were caused by carelessness of any individual.

Clause Nine.—The Toronto Committee were instrumental in securing the enactment of very important legislation at the last sitting of the Legislature, which defines a master plumber, and a journeyman plumber. This is for the municipality of Toronto, but being on the Provincial statutes, it could now be easily secured for any locality.

A Master plumber, is defined to be a person skilled in the planning, superintending, and the practical installation of plumbing and familiar with the laws, rules and regulations governing same, having a regular place of business and who himself or by his journeymen plumbers in his employ, performs plumbing work.

A Journeyman Plumber, is a person other than a master plumber who has been working under a master plumber for one or more years and desires to follow plumbing as his calling.

Clause Ten.—Your directors have given considerable thought to the conditions that prevail in our trades, in connection with the manufacturers and supply houses. These are matters that have always received more or less attention at all gatherings of this and the Canadian Society, and the evils that exist are common to every section throughout Canada.

It is with these points in view that your directors to-day, do ask each one of you to carefully consider the necessity of some joint action being taken, that will eliminate these objectionable features from our midst.

We are all agreed that profits as based on our contract work have been nil, and how any of us can continue to do business on a trade protection of fifteen per cent., when it is a well known fact that our average overhead cost is anywhere from seventeen to twenty-one per cent., therefore, is it any wonder of the unsatisfactory conditions that surround our business.

Your directors, therefore, submit the following conditions of trade for your approval:—

(1) The cash discount of 2 per cent. thirty days, to be altered to 5 per cent. if paid on or before the 20th of the month following the date of the goods.

(2) The regular trade discount to be offered and granted solely to legitimate master plumbers, steamfitters, and to the following public utilities: Federal and Provincial Governments, municipalities, Government-owned railroads, power and light companies, general contractors not to be classified, under any circumstances, as master plumbers, steamfitters, or as public utilities.

(3) When quotations are requested by others than those enumerated in Clause Two, a 25 per cent. increase to be quoted.

(4) The furnishing of plans, specifications and estimates to be discontinued in the Province of Ontario.

Your directors wish to thank one and all for the support they have received while in office, and more so, those who assisted by the payment of their dues. It is with a hope that more settled conditions will soon be with us, when we may all benefit from our labors in the interests of this Society, and the welfare of the craft generally.

Thanking you once again, we are,

Yours sincerely,
THE DIRECTORS:
F. R. MAXWELL, President
F. H. GENTLE, Vice-President
THOMAS MAXWELL, Treasurer.

Clause One, was approved as read, on order of President Maxwell.

Clause Two, was adopted, on motion of Harry Mahoney and Fred Smith.

Clause Three, letter as received from the president and secretary-treasurer of the Canadian Society, was read by Secretary Frankland:—

Garrett Frankland,
Vice-Pres. for Prov. Ontario,
Toronto, Ontario.

Montreal, Feb. 21, 1917

Dear Sir:—

At the regular meeting of your Sub-Executive held Feb. 20th, it was unanimously decided to dispense with the annual convention this year as it was felt that the conditions presently existing here must prevail everywhere in Canada. All our members are contributing to the approaching victory, some at the front, some in the Home Guards, and others in many various ways. It was deemed advisable to postpone the convention to be held in Montreal until June, 1918, when circumstances should be more favorable.

But if there is to be no convention this year, it does not necessary follow that there is to be no business. On the contrary, your Sub-Executive is willing to remain in office for another year and devote their energies towards the ultimate success of your society. They wish it to be distinctly understood that they are prepared to handle all suggestions, questions or complaints in the same manner as if presented to a regular convention. They therefore heartily invite your co-operation and also wish to point out that they will be pleased to receive prompter answers to their letters than in the past.

As the regular business of the Society is not to be discontinued, the capita tax has been fixed at $1.00 per member as in the past.

Kindly place this letter before your fellow members at the earliest date possible and acquaint me with their opinions.

Yours very truly,
L. J. CONROY,
Secretary

ALEX. CHARETTE, President,
414 Ontario East.

On motion of Wm. Mansell and Robt. J. Shannon, the communication from the Canadian officers was ordered to be received and filed, and Clause Three was adopted, the per capita being paid on the members in good standing at Februray 1, 1917.

Clause Four, on Motion of Harry Mahoney and Robert J. Shannon, was approved, the directors to continue action along the same lines as already carried out in the collection of the outstanding dues, the results to date being most satisfactory, as explained in the correspondence as read by Secretary Frankland.

Noon hour arriving at this point, a helt was called in the proceedings until 2 p.m., by President Maxwell.

Afternoon Session

President Maxwell called the members to order at 2 p.m., and the directors' report was proceeded with from Clause Five.

Clause Five was read by Secretary Frankland, and no action being taken by the members, it was declared carried by President Maxwell.

Clause Six.—On motion of Harry Mahoney and Fred Smith, this clause was approved, the directors to take the necessary action to have their suggestion carried out.

Clause Seven.—This clause was approved, and upon motion of Harry Mahoney and William Mansell, the directors to choose an appointee to Board of Boiler Inspectors to represent this society on that board.

Clause Eight.—This clause was carried by the general assent of all present.

Clause Nine. — President Maxwell called upon Chairman John Wright, of the Sanitary Committee of the Toronto Society, to explain this clause, as Mr. Wright was instrumental in having this legislation enacted for the Toronto craft.

Mr. Wright explained the reasons leading up to the securing of these definitions by the Legislature, and expressed the hope that other localities would apply for them.

On motion of Ex-Mayor Harry Mahoney, of Guelph, and William Mansell, the directors are to consider the advisability of having the statutes changed, so that this legislation will be enacted throughout the province.

Clause Ten was read by Secretary Frankland. After considerable discussion, the conditions of Clause Ten were approved, and upon motion of E. H. Russell and Wm. Mansell, Clause Ten was carried.

On motion of Geo. Clapperton and Geo. E. B. Grinyer, it was decided that the heating and plumbing houses be forwarded copies of approved trade conditions, requesting an answer by June 1, 1917.

The Auditors' report on the financial statement was received, and adopted, on motion of Wm. Mansell and John Wright.

Auditors' Report

Gentlemen,—We have examined the financial statement of the society for the year ending January 31, 1917, and found same correct.

Toronto, April 24, 1917.

FREDERICK SMITH,
THOS. H. FERGUSON,
Auditors.

Mr. William Mansell moved, and Mr. L. LeGrow seconded a vote of thanks to the directors, and the secretary for their earnest endeavors in behalf of the society during the past year, and re-appointed them and the other officers for another year.

President Maxwell expressed the thanks of the directors, secretary, and the officers, for the honor bestowed upon them, and assured those present that all hands would do their best during the ensuing year.

President Maxwell requested the members to inform the secretary as to any of the members who have gone overseas, as we are compiling a Roll of Honor of those members.

Mr. Shannon mentioned that Mr. Spalding, of Bernhardt and Spalding, had enlisted, the secretary being instructed to make enquiries.

The meeting was then adjourned by President Maxwell at 5 p.m.

The following gentlemen were re-elected as office bearers for the year 1917-18:

Directors.—Frank R. Maxwell, President, Toronto, Directors' Report.

Fred. H. Gentle, Vice-president, Toronto, Manufacturers' Report.

Thomas M. Maxwell, Treasurer, Toronto, Financial Report.

Secretary—Garrett F. Frankland, 1093 Bathurst street, Toronto.

Honorary Directors.—Ernest H. Russell, James R. Haslett and A. E. Gibbons, of London; William Mansell, Lewis LeGrow, George Capperton and Harry Hicks, of Toronto.

Auditors.—George Ross, Brockville; James R. Haslett, London; Fred Smith, Guelph.

Trustees.—E. H. Russell, London; Harry Mahoney, Guelph.

Sanitary Committee.—Robert McG. Coyle, Chatham.

Heating Committee.—Ben Noble, London.

Arbitration Committee.—H. S. Brown, Brockville.

Legislation Committee.—Angus McDonald, Stratford.

Apprenticeship Committee.—Henry E. White, Brantford.

Educational Committee.—George E. B. Grinyer, Guelph.

Examination Board.—The Directors.

Straight Talks to the Craft

Being the Third Article Dealing With the Proceedings of the Last Four National Conventions, Provincial as Well as Local Convention Proceedings Will Also be Commented Upon.

By One of Us.

ARTICLE III.

CONTINUING our discussion with reference to the business of the eighteenth, National Convention, the next item to be referred to is the report of president Young, Calgary.

Mr. Young made some splendid suggestions which meant real work for someone. He pointed out that certain work was being done in the West by a newly formed association, and particularly requested that this new association and the work done by its members be given some consideration.

It was an earnest appeal for co-operation but speaking frankly it was to a great extent sidetracked by the majority. We are reprinting the most important items of Mr. Young's report for the benefit of our readers. After a few complimentary remarks about the Ontario society and regretting his inability to be present etc., he said:

"I would suggest for your consideration that all these western provinces from Manitoba to British Columbia be formed into a western branch of the Canadian Society, and all the east with an eastern society, as distances are too great to get proper representation at any convention. Also that the National be an executive body only, composed of a president, vice-president and secretary of each section, to meet at the call of either section.

"A movement which I particularly wish you to consider and further in the east is the getting together in convention of sanitary engineers and plumbing inspectors from every city in the east to discuss and draft uniform model by-laws.

"Such a movement was set on foot in the west just after last year's (1913) convention in Calgary, by Mr. E. P. Fletcher, chief plumbing inspector, Calgary, which materialized into a very successful convention being held in Winnipeg, where representative sanitary engineers, plumbers, inspectors and supplymen met from every city of importance between Fort William and Port Arthur in the east, to Vancouver, B.C., in the west. Calgary is adopting many features of this uniform by-law on July 1st of this year 1914.

"This new and vigorous association has been named 'The Canadian Institute of Sanitary Engineers.' Their next meeting is in Edmonton, in April or May next. One important result was the standardization of certain material, such as brass ferrules, lead traps, bends, pipe, etc., etc. A research committee was formed and they would like data on the following: Plumbing material installations, size of soil and vent pipes, examination of sanitary engineers and plumbers."

Now, would it not appear to most readers that the above report was at least worthy of some real concrete consideration?

First there was a statement of facts, that a certain new association had been formed whose sole aim was to benefit every member of the craft from coast to coast.

Second there was an appeal for co-operation, coupled with a request for data.

Third, there proof was given of "something attempted, something done" which proved also that the Canadian Institute of Sanitary Engineers was an

(Continued on page 27.)

THE SANITARY ENGINEER

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Circulating amongst Sanitary, Heating and Ventilating Engineers, Gas Fitters, Sanitary Inspectors, City Engineers, Boards of Health, Architects, etc.

MAY 15, 1917

THAT "GRAFTING" YARN AGAIN

"SPEAKING of graft recalls to mind an advertisement that I saw in the columns of a local newspaper the other day. It is interesting chiefly because it is much more frank than any other advertisement calling for the services of the same type of man that I have yet run across. Here it is exactly as it appeared:

> 'Wanted—Office Man with knowledge of plumbing and heating supplies, preferably a man with fair idea of grafting. Apply to Mr. Glenister, Ashdown Hardware Co., Ltd.'

"Surely there should be no difficulty in supplying this want in Winnipeg. We have only to read the hectic columns of our local newspapers to be prepared to reach the conclusion that at least ninety-nine per cent. of the population is composed of grafters—and that the other one per cent. must possess what the advertiser desires in his applicants—a 'fair idea of grafting.' As for there being any difficulty in obtaining such a person in the ranks of the plumbers—that is simply absurd. I have never yet met anyone connected with the plumbing business who did not possess much more than a 'fair idea of grafting.' "—*Winnipeg Post.*

EDITOR'S NOTE.—Our readers will recall having seen an item similar to the above in last issue of THE SANITARY ENGINEER, and will see that the word "grafting" should have read "drafting."

The Ashdown Hardware Co. may not take such matters very seriously, but THE SANITARY ENGINEER does, particularly when the *Winnipeg Post,* or at least the person who writes the last paragraph, declares:

> "I have never yet met anyone connected with the plumbing business who did not possess much more than a 'fair idea of grafting.' "

Such a statement is an insult, and the plumbing trade in Winnipeg should demand an apology from the editor, or writer of the article, whoever he may be.

It is such trash which keeps the public ever in a quandary as to who is honest or dishonest. If we are to take the words of the Good Old Book as our guide and consider for a moment those words: "By their fruits ye shall know them," as meaning what they say, then the plumber can show more actual good fruits of his labor than any other human being in existence.

He has made buildings fit to live in, towns and cities he has cleaned up. His work would prevent 90 per cent. of the ills which humanity is suffering from were it not for the ignorance displayed by such slanderous statements made by irresponsible persons who write to papers like the *Winnipeg Post.*

The public have been pampered too much by the plumbing trade in trying to make a job meet the price, and when a price is cut down the job also has to suffer and in the end the public, but they always get what they pay for and more from the plumber as a rule.

Can that *Winnipeg Post* writer point out a class of business men that work longer hours than the plumber? He is at the beck and call of the public night and day, and he is not by any means in the wealthy class, and never will be in spite of all the supposed grafting.

NECESSITY CALLS

ON another page there appears an article entitled, "Federal Department of Health," being the introduction of a bill which was before the House recently. Dr. Steele, the sponsor of the bill, was in earnest in his endeavor to show the members of the House that we in Canada are losing valuable time and lives. What Dr. Steele needs most is assistance from every practical thinking man. Never was there a more needy call made to sanitary and heating engineers. They can make their voice heard and the influence of their work felt throughout the Dominion, just as was the efficient work of the sanitary engineers recognized in the Panama zone.

Central Hot Water Heating Plant

The Rockwood Hospitals for the Insane, Kingston, Changes Over the Heating Appliances—Light Hot Water Furnaces Replaced by Steam Water Heaters —Exhaust Steam From Electric Steam Generators the Source of Heat.

By John E. Noble.

A VERY novel "change over" was made in the heating appliances in connection with the above named building some months ago, which has proved all that could be desired during the past winter.

The institution consists of eight separate buildings, some of which are shown in the illustration accompanying this article. The eight buildings all contained a regular hot water furnace, and were piped in the ordinary way for hot water heating.

It was found, however, that as a large steam plant had to be in use for the purpose of generating electricity, laundry work, and steam heating appliances of various kinds, that to use all the exhaust steam would result in considerable saving, as well as be very much more convenient.

The buildings, too, are situated upon various levels, and thus require the use of a number of steam traps. These were furnished by the C. E. Squires Co., Cleveland, U.S.A.

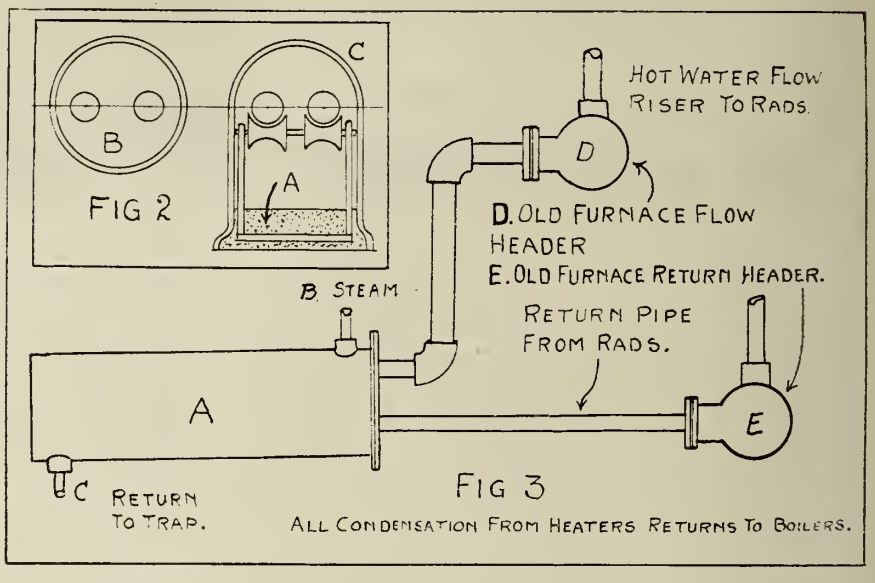
A number of Sims converters were installed to take the place of each furnace, the connections were made by simply connecting the heaters between the flow and return furnace headers. Plan of the method followed is shown in Fig. 3. A represents the Sims converters, B and C the steam supply and return pipes. The latter are all connected to a steam trap, all the water of condensation being returned into the boiler room and pumped back into the boilers by steam pumps. All the returns return by gravity as there is a splendid fall, as shown in the profile plan, Fig. 4.

The letters represent the buildings and the figures give the number of feet fall between each building.

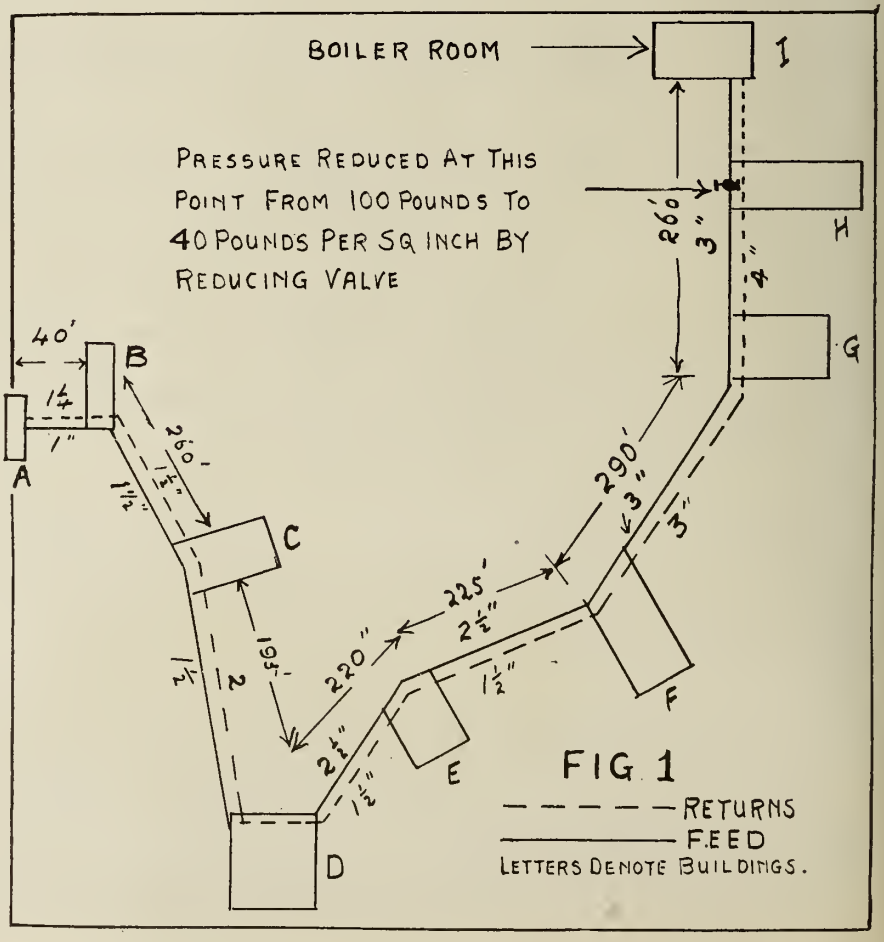
Fig. 2 shows how the piping was installed between each building, ordinary 12-inch glazed tile pipe being used, the pipes being supported at numerous points as shown at C, Fig. 2. A rod ½ x 1½ was bent as shown and drilled so as to hold the axle for the rollers. The bottom part of the support was embedded in cement. Wherever these supports were necessary, a 12-inch tile tee piece was used, the hub being used in the manner shown in Fig. 2.

Fig. 1 shows the pipe lines from building to building and the length of the runs, the accompanying table shows the amount of radiation contained in each building, the dotted lines represent the returns, and the solid lines the feed.

The steam plant from which the exhaust steam is procured consists of 5-100 B. H. P. each. These, as stated before, furnish steam for quite a number of purposes, the returns from all appliances all convey the condensation back to the boiler room.



Prior to these changes, a number of steam engines and pumps were used for various purposes; these have been re-





Some of the buildings now heated by Sims hot-water heaters, using exhaust as well as live steam.

placed by electric motors, thus centralizing all the steam generating plants, or appliances in the one boiler room.

The steam boilers not only furnish steam for generating electricity, but also for domestic hot water supply. All the steam and hot water piping is covered with sectional pipe covering, which, too, has returned in a very large saving of fuel.

Contents of Square Feet of Hot Water Radiation in Each Building

A, 1150 sq. feet; B, 2600 sq. feet; C, 1000 sq. feet; D, 1620 sq. feet; E, 900 sq. feet; F, 1644 sq. feet; G, 1110 sq. feet; H, 980 sq. feet.

The working pressures are as follows: The boilers carry a constant working gauge pressure of about 100 lbs. per square inch, governed by a pressure reducing valve, to the Sims converters, at 35 to 40 lbs. pressure, coils for the purposes requiring only 5 to 10 lbs. of steam.

The consulting engineers who reconstructed this novel installation were Messrs. George Black & Co., Toronto.

The plant has shown a considerable saving of fuel, time and attention, less labor, no ashes to clean out of the separate furnaces.

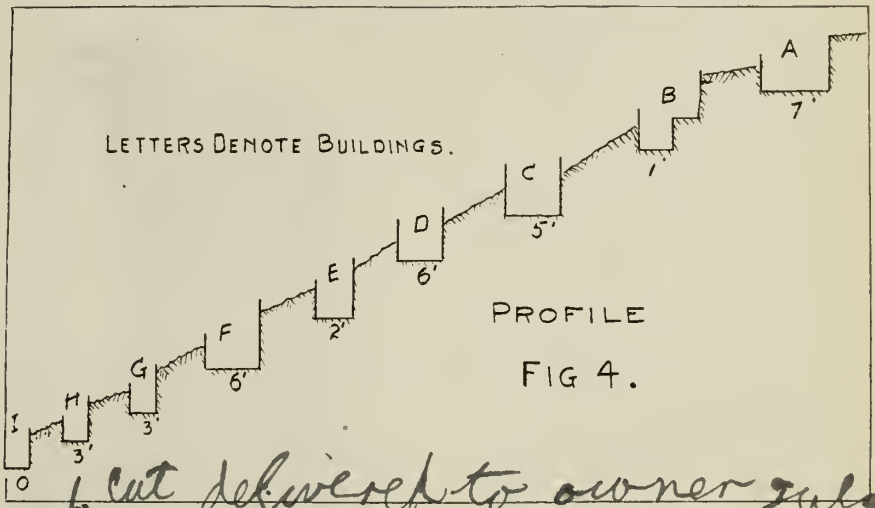
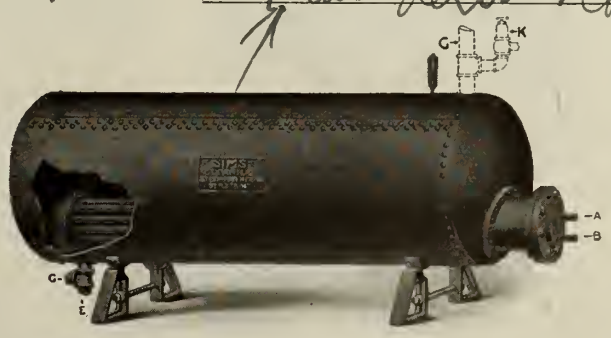


FIG 4.

Cut delivered to owner July 26th 19



The type of converter used in the Rockwood Hospital for the Insane, Kingston, Ontario.

CHANGE OF ADDRESS

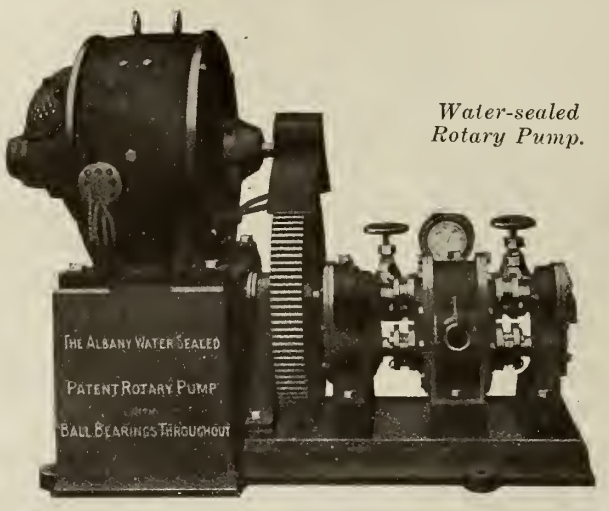
The Montreal Master Plumbers' Association have made a change recently by moving to new quarters.

The new address is Suite 623, Drummond Building, and the telephone number is Uptown 669. David K. Trotter is still the secretary, to whom all communications (c/o Montreal Master Plumbers' Association) should be addressed.

New Sanitary and Heating Goods

WATER SEALED ROTARY PUMP

THE Albany Pump Co., Toronto, are now building the Albany patent water-sealed rotary pump, which heretofore has been imported from London, England. The general design of this pump is similar to other rotary pumps on the market, in that it consists of a metal casing, inside of which revolve the impellers or wheels. The most important feature of this pump is the fact that slips and leakage have been reduced to a minimum by the introduction of grooves cut along the faces and edges of the teeth, so that in rotating a body of water lodges in the grooves forming an absolutely sealed water-tight joint or cushion between the casing and the rotating rollers, thereby producing an efficient vacuum. Centrifugal force also adds greatly to the efficiency.



Water-sealed Rotary Pump.

The pump is suitable for dealing with all kinds of liquids, the wheels and casings being made of different metals according to work for which it is required. Quite recently a pump was installed in Toronto for handling asphalt, which shows the wide range of application of such a unit.

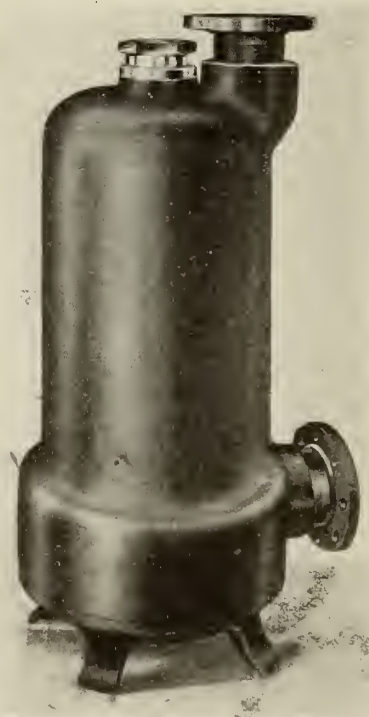
The pump is designed for motor drive through a gear wheel and raw hide pinion, also for belt drive or by gasoline engine. In the latter case, the pump drive is through a roller chain, and not direct connected as formerly. The speed of the pump is the same for the medium and larger sizes, being 200 r.p.m., and the various outputs range from 700 to 60,000 gallons per hour. The speed of the smaller sizes, however, varies, the minimum capacity of the small pumps being 60 gallons per hour.

The "Albany" pump has achieved considerable success in pumping fuel oil, and several outfits have been placed in H. M. Dockyards, and are being largely used by the British and French Admiralties. After an exhaustive test, several of these pumps have been installed in H. M. submarines for pumping water from the trimming tanks.

NEW HOT WATER HEATER

During recent years great strides have been made in all manner of heating appliances, both hot water and steam.

The utilization of steam at high or low pressures, exhaust or live steam, has been also given great attention. These are proved by there now being quite a number of hot water heaters on the market for the purpose of converting steam heat, that would in many cases be otherwise wasted, into hot water for both direct hot water heating systems and for domestic hot water supply. The latest heater to come to our notice is that now known as the "Modern" heater, manufactured by the Modern Heating & Engineering Co., Ltd., 83 Bleury St., Montreal, from whom further particulars may be procured upon application.



Modern steam hot water heater.

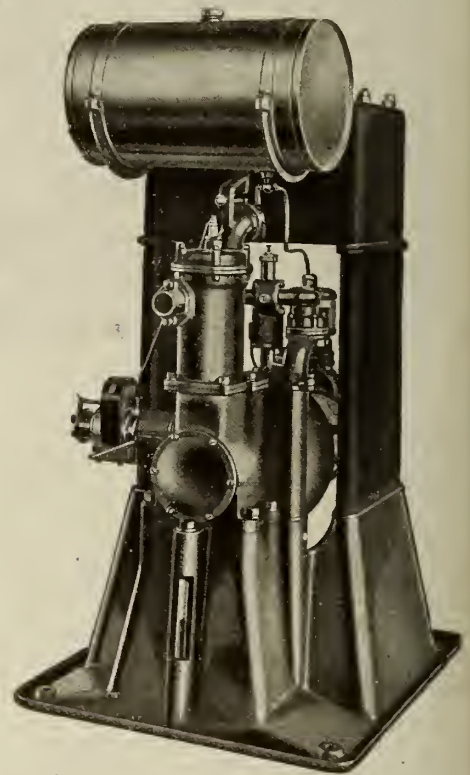
A NEW ELECTRIC LIGHT AND POWER PLANT

One of the worst features of farm life is without doubt, that of being in want of small power units, as well as lighting. The coal oil lamp has been the cause of many fires and loss of life to the farmer and rural resident.

This has not only been the case among the poor class of farmers, but similar conditions have existed among the wealthy too.

From now on however, this need not be the case, inventors have realized this and have put forth their best efforts in such a way as to provide just about all that can be desired on the farm or in the rural home.

One of the latest inventions to be put on the market is a new electric generating plant known as the "Uni-Lectric"



Uni-Lectric Lighting and Power System

Lighting system. The claims made by the manufacturers are certainly very striking and novel. Unlike other small electric plants that require cumbersome storage batteries, it is claimed that this unit requires no batteries, that it gives a steady and very effective light, and can be used for power as well as lighting purposes. The manufacturers also state that their system will furnish electricity for small heating appliances. Pumping, ironing and operating all manner of domestic utensils.

A book entitled "Uni-Lectric Light and Power is being distributed by the manufacturers, which will be interesting to every sanitary and heating engineer. It can be procured by writing to the Waterman Motor Co., Detroit Michigan, U.S.A.

Installation of Pneumatic Water Systems

Many Readers Are Being Confronted With Problems Relating to the Proper Installation of Pneumatic Water Systems—The Following Article is the First Which Actually Deals With Problems Mentioned in the Last Issue.

By "Troubles Man."

THE first problem to be dealt with in this series of articles, is that of an installation, which is shown in Fig. 1.

This shows two pumps connected to one suction line, and the trouble is found with the power pump, the experience is as follows:—

When the pitcher pump is operated, there is plenty of water procured as soon as it is used, that is, providing the power pump below has not been operated for a while. For instance, suppose the pump in the kitchen only has been used. Every time it is used water is procured at once. But if the power pump has been put into action, the pitcher pump has to be operated for several minutes before the water comes. This condition has led many to believe that the fault is in the power equipment, which, however, is not the case.

Here is the cause of the trouble: First let us suppose that the pitcher pump in the kitchen is used, water is procured; there then remains a column of water in the suction line, providing, of course, that a good type of foot valve is fitted on the pipe as shown. This column of water is always in readiness to be drawn through the pump.

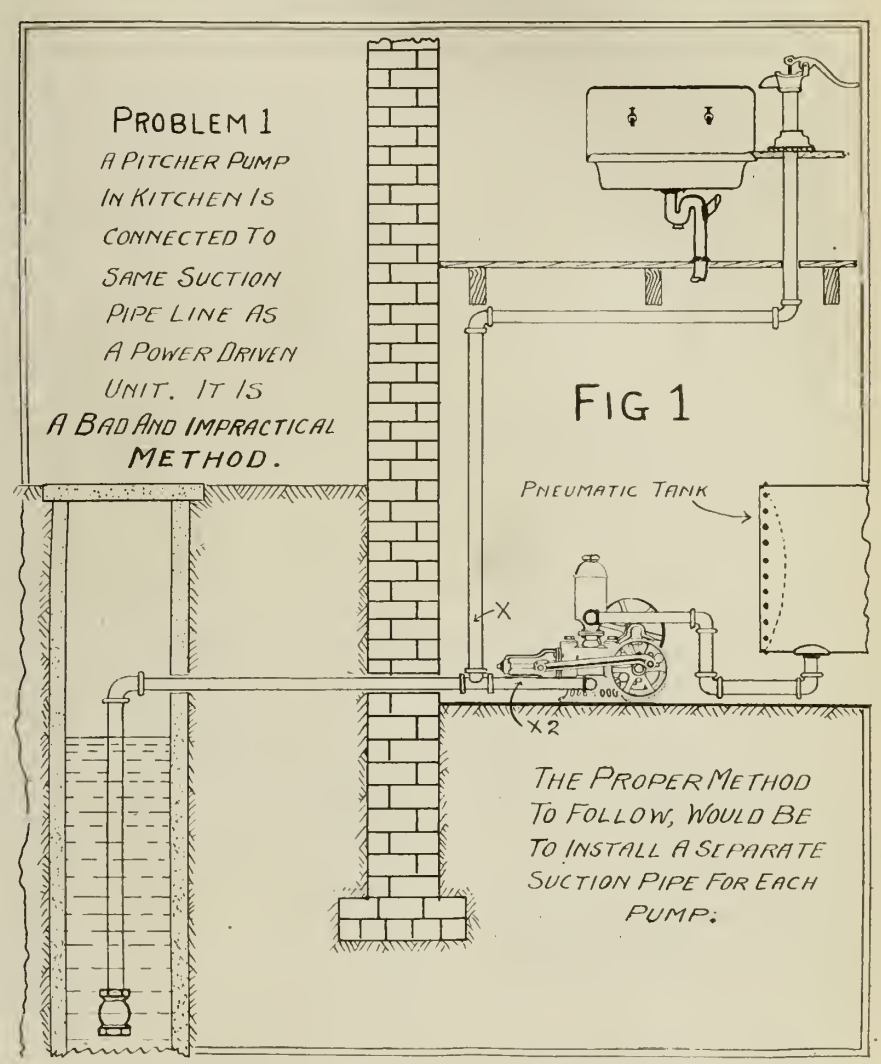
But if the power pump is now put into motion, it will draw a quantity of water for a time, that is, just until that period which breaks the suction, caused by the pitcher in the kitchen leaking a little, because there never was a pitcher pump made that could hold its priming if another pump be installed on the same line, as in manner shown in Fig. 1. The power pump would exert too much of a vacuum on the line to which the pitcher pump is connected, and would therefore draw air through the pump rather than water from the well.

Now, one is apt to ask how this trouble may be overcome and what is the best plan to follow in a case like this.

By all means instal a separate suction line for each pump. The question then may be raised as to how this can be done when an artesian well is the source of water supply.

Our reply is that there are conditions which may at times warrant following other methods. There is also the job where a long horizontal length of pipe to a well would be a very costly method, if two pipes were absolutely necessary. This, too, may warrant trying another method.

Note Fig. 1 again. If a first class, and absolutely dependable vertical check valve could be procured and inserted at X, and another check of the horizontal type be placed at X2, then one suction line could be installed, and to a certain extent good results would be obtained. But where there is a dug well and where not too long a run of horizontal pipe is required, it is always the best way to instal a separate suction pipe for pump.



The next problem to be taken up will be as follows:—

No. 2

A pneumatic tank appeared to be leaking, at least it did not maintain the air. Water could not be got through one of the faucets, a pipe had been taken off top of tank above the high water line.

(Continued in next issue).

A NEW BOOK ON PIPE

Sanitary and heating engineers are no doubt the largest users of small-sized piping that is subject to very hard usage. This being the case, a new book just off the press entitled "Pipe and the Public Welfare," by R. C. McWane, New York, would prove both valuable and interesting. The book contains some splendid illustrations regarding the history manufacture and tests, both experimental and in actual use.

Opponents of cast iron pipe for house drains would be once and for all silenced if some of the data that appear in this book were shown them. Those sanitary and heating engineers wishing to procure a copy of this book should write the Book Department, MacLean Publishing Co., University Ave., Toronto.

NEW NAME

H. A. Weinraub, sanitary and heating engineer, 199 Parliament St., Toronto, has adopted another style of business title, and will now be known as The Acme Plumbing & Heating Co., Toronto.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

OPTIMISTIC reports are forthcoming from certain quarters as to the amount of building that is going on at present. Some dealers in plumbing supplies report that the city trade is good. The big demand for valves for shipbuilding is continuing and there is promise that still heavier supplies will be required for this work as soon as contracts already authorized have been let. A heavier demand for oakum is expected to develop from this quarter also as soon as specifications for contracts are made public. Reports also come in that building permits in smaller centres outside Toronto are fairly large in number and this would indicate a better demand for plumbing supplies from this quarter. There have been a number of important price changes during the time intervening since last issue, notable among them being an advance in wrought iron pipe, galvanized sheets, lead pipe, lead waste pipe, traps and bends, lead sheets, solder, corrugated sheets and some old materials, such as brass and copper.

TORONTO, May 14.—There is a fairly good amount of building proceeding in various sections of the country. Reports continue to come in to the effect that dwellings are being erected in considerable numbers, although there is no approach as yet to a building boom. Structures that are being put up are for very much needed buildings and are being constructed in spite of the high cost of materials. This latter feature is operating to curtail any undue amount of building activity. Demand for valves in some lines has been good, particularly in globe and gate valves and for such types as are used in mill construction. There is a good demand for cast iron fittings and the market is firm.

Wrought Iron Pipe Advances $10 Per Ton

Toronto.

IRON PIPE.—An advance made effective on May 3, 1917, provides for an increase of $10 per ton in the price of wrought iron pipe. All sizes were increased five points with the exception of genuine wrought iron. Those lines that have advanced included standard buttweld and lapweld S/C extra strong buttweld and lapweld pipe P.E., XX strong buttweld and lapweld pipe P.E. There is a scarcity in raw materials for the making of pipe, and manufacturers are finding it difficult to meet the demand for pipe in the face of conditions. This does not indicate that the demand for pipe is big, but rather that available supplies are eagerly taken up. Following are the new net prices:—

WROUGHT IRON PIPE.

Standard Buttweld.

	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 4 50	$ 6 00
¼ in.	4 72	6 76
⅜ in.	4 72	6 76
½ in.	6 04	7 61
¾ in.	7 59	9 72
1 in.	11 22	14 37
1¼ in.	15 18	19 44
1½ in.	18 15	23 24
2 in.	24 42	31 27
2½ in.	39 20	50 02
3 in.	51 26	65 41
3½ in.	63 48	80 50
4 in.	75 21	95 38
Lapweld.		
2 in.	27 38	33 86
2½ in.	40 95	51 19
3 in	53 55	66 94
3½ in.	65 32	83 26
4 in.	77 39	98 65
4½ in.	90 17	114 90
5 in.	105.10	133 90
6 in.	136 30	173 80
7 in.	178 50	224 90
8 L in.	187 50	236 30
8 in.	216 00	272 20
9 in.	258 80	326 00
10 L in.	240 00	302 40
10 in.	309 00	389 30

Prices—Ontario, Quebec and Maritime Provinces.

Cast Iron Fittings In Very Firm Market

Toronto.

SOIL PIPE, FITTINGS.—There is a strong position in the market for cast iron fittings and there are indications that an advance may be recorded in the near future. The demand is good, as considerable quantities are being used on heating jobs that are being installed. Soil pipe and fittings remain unchanged at the advances recorded in last issue. Malleable fittings also remain unchanged at net list.

	Discount
Medium and extra heavy soil pipe, 6-inch and under	50%
8-inch soil pipe	40%
Medium and extra heavy fittings, 6-inch and under	50% and 10%
Cast iron fittings	35%
Malleable fittings, Class A	15% on list
Do., Class B Band C	Net list
Cast elbows, tees, etc.	30%
Unions up to 3-inch	50%
Plugs	40%
Bushings	40%
Flange unions, standard	40%
Nipples, up to 4-inch	55%
Do., 4½-inch and larger	45%
Do., running thread 4-in. and under	30%
Dart unions, ¼-inch to 2-inch	25%

Marine Work May Make Valve Demand Heavier

Toronto.

VALVES.—Although the demand for valves for marine work is already good, as reported from certain quarters, it is anticipated that it will be still heavier when specifications on ships for which contracts have been let are given out. Some manufacturers of valves are already working to capacity but are finding their operations restricted somewhat through inability to get the right kind of labor. The trouble in this respect, however, is not glaring. Gate and globe valves are in good demand, but radiator valves are naturally a little slow at this season. Prices on valves remained unchanged during the time since last issue.

Ground work	35-53
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0, standard	49-53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	10
Radiator valves, standard	15
High grade	15
Patent quick opening valves	55
Basin Cocks—	
No. 0 and ½ Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	35-40
Radiator valves, standard	40
Radiator valves, Jenkins disc.	45
Radiator valves, quick opening	45

Building Permits At Outside Points Good

Toronto.

ENAMELWARE.—There has been a fairly good demand for enamelware, although it is not heavy by any means. Encouraging reports are coming in from the smaller centres as to the number of building permits that have been taken out there within recent weeks. There has been a noticeable increase in these permits. To some the demand for enamelware has kept up surprisingly well in view of the conditions that prevail in wartime. Prices remained unchanged at those given hereunder.

Bathtubs, roll-top, 4, 4½, 5 feet. 24 to 30 in. wide	$28.50
Bathtubs, 5½ ft.	32.10
Sinks, roll-top, 18 x 30 in., staple	14.60
Closets	21.00

Range Boilers Hold In Steady Market

Toronto.

RANGE BOILERS.—Following the advance of 50c recorded in last issue on range boilers, there has been a steadiness to the market and prices have remained unchanged. Demand is fair, with an undertone of firmness due to the condition of the raw material market.

30-gallon range boilers, standard	$11.00
30-gallon range boilers, extra heavy	13.50

Shipbuilding May Increase Oakum Demand

Toronto.

OAKUM.—Dealers in oakum are anticipating that larger supplies of oakum will be required as soon as specifications for the contracts of ships authorized have been let. In certain quarters there is a tendency toward higher prices during the week, but at the time of writing these had not been announced. There is a fairly good demand for plumbers' spun with the price ranging from 8½c to 9c per pound.

	Per 100 lbs.	
Best American	$20.75	$21.00
U.S. Navy (American)	....	20.00
Plumbers' Spun	8.50	9.00

Take in items from H & M May 11, Toronto report, on:—Sheets and Plates, Lead and Zinc Products, Corrugated Sheets. Boiler Tubes, Old Materials, Ingot Metls.

Upward Movement General In Sheets

SHEETS, PLATES. — Other concerns moved toward higher levels in black sheets during the week following the advance recorded by one concern in these columns last week. The increase amounts to 50c per hundred pounds which makes the range of prices within narrow limits. Deliveries of black sheets are coming fairly well from the mills in the United States, but mostly on delayed orders that should have arrived some months ago. In boiler plates there is an exceptionally good demand, which demand is expected to increase. These plates are being used in the manufacture of ships and this industry is making great strides at the present time. The market for plates is in very firm position.

	Per 100 lbs.	
10 gauge	$....	$7 50
12 gauge	7 55	7 60
14 gauge	7 45	7 50
16 gauge	7 50	7 60
18-20 gauge	7 30	7 65
22-24 gauge	7 35	7 70
26 gauge	7 40	7 75
28 gauge	7 50	7 85
29 gauge	7 60	....
¼-inch boiler plate	....	8 00

Corrugated Sheets Go Still Higher

Toronto.

CORRUGATED SHEETS. — Still higher prices than those recorded last week have been made effective on both galvanized and painted corrugated sheets. No. 28 gauge galvanized is quoted at $7.25 per 100 square feet and the painted sheets are selling at $6. In the painted sheets there is a straight advance of 50c on all sizes. Demand for corrugated sheets is not heavy as yet, but stocks are dwindling and with firmness in the market for raw materials from which they are made there is a continued firmness in the market for the sheets even at the recent advances. Dealers point out that corrugated sheets are not as high as the plain sheets which is an inconsistency.

Galvanized shingles have also been advanced $1 per square which makes the price now $8 per square and $6.25 on painted shingles. Metal siding has made a corresponding advance and is now quoted at $7 per square for galvanized and $5.50 for painted. Following are the new prices on corrugated sheets:

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$ 7 25	$ 6 00
No. 26 gauge	8 00	6 75
No. 24 gauge	12 00	9 00
No. 22 gauge	14 50	11 00
No. 20 gauge	17 00	13 50
No. 18 gauge	22 00	17 00

Boiler Tubes Take On A Firmer Tone

Toronto.

BOILER TUBES.—There was a firmer tone in the market for boiler tubes during the week as a result of action taken by certain Eastern Canadian dealers in increasing the price. Toronto dealers were of the opinion last week that although the recent advances in the American market warranted an advance in the local market still there was hesitancy in putting the price higher because of the already high level at which they are quoted. It was pointed out that the action of Eastern dealers might necessitate higher prices here. Demand is not heavy as yet.

	Per 100 Feet Cold Drawn	Lapweld
1-inch	$24 00	$ ....
1¼-inch	30 00	....
1½-inch	32 00	25 00
1¾-inch	32 00	25 00
2-inch	35 00	26 00
2¼-inch	37 00	....

Lead Pipe Advances; Solder Also Higher

Toronto

LEAD AND ZINC PRODUCTS.—An advance of 1c per pound in lead pipe and lead waste pipe was recorded during the week which now makes the selling price 17c per pound for lead pipe and 18c per pound for lead waste pipe. Lead traps and bends have advanced about 5 per cent. being now sold at 15 per cent. on list prices. Solder has advanced approximately 2½c per pound, guaranteed being now quoted at 37½c per pound, 36c for strictly, 34½c for commercial, and 34c for wiping solder. Solder wire has advanced 1¼c per pound. and is now quoted at 36¼c. Zinc sheets have increased 1c per pound, being quoted now at 26c per pound. This increase in solder is directly due to the announcement of a 10 per cent. increase in the tariff of the United States whereby tin and other products that enter into the manufacture will be affected.

Lead pipe, lb.	$0.17	....
Lead waste pipe, lb.	0.18	....
Lead traps and bends	15% on list	
Lead wool, lb.	0.16	....
Lead sheets, 3 lbs. sq. ft.	0.16	....
Lead sheets, 3½ lbs. sq. ft.	0.16	....
Lead sheets, 4 to 6 lbs. sq. ft.	0.15½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0.37½	....
Solder, strictly, lb.	0.36	....
Solder, commercial, lb.	0.34½	....
Solder, wiping, lb.	0.34	....
Solder, wire, lb.	0.36¼	....
Zinc sheets, per lb.	0.26	....

Old Brass And Copper Again Up

Toronto.

OLD MATERIALS.—There was a movement toward higher levels for old materials during the week when the price paid by dealers for yellow brass was increased ½c per pound, ½c increase on red brass, ¼c increase on heavy zinc, ½ cent increase on heavy copper. Old cast iron was also advanced $1 per ton. Old tires, however, were slightly easier being quoted ¼c pound down. The firmer prices in brass and copper are due to the higher prices being paid for the ingot metal in the United States. There has been a fair demand for these products.

Tea lead	$ 0.07	.....
Heavy lead pipe	0.10	.....
Yellow brass	0.15	.....
Red brass	0.20	.....
Light brass	0.10½	.....
Heavy zinc	0.09½	.....
Heavy copper	0.25	.....
Old cast iron, per ton	24.00	.....
Stove plate, per ton	18.00	.....
Old rubbers, boots and shoes	0.08¼	.....
Overshoes, lumbermen's rubber boots	0.06½	.....
Bicycle tires	0.03½	.....
Auto tires	0.05¾	.....

Lead And Tin Have Made Advances

PIG IRON.—The pig iron situation locally is unchanged, and no prices are obtainable. In Buffalo, prices range around $45 furnace for all grades. The furnaces are not anxious to do business, as very little iron is available that has not been contracted for.

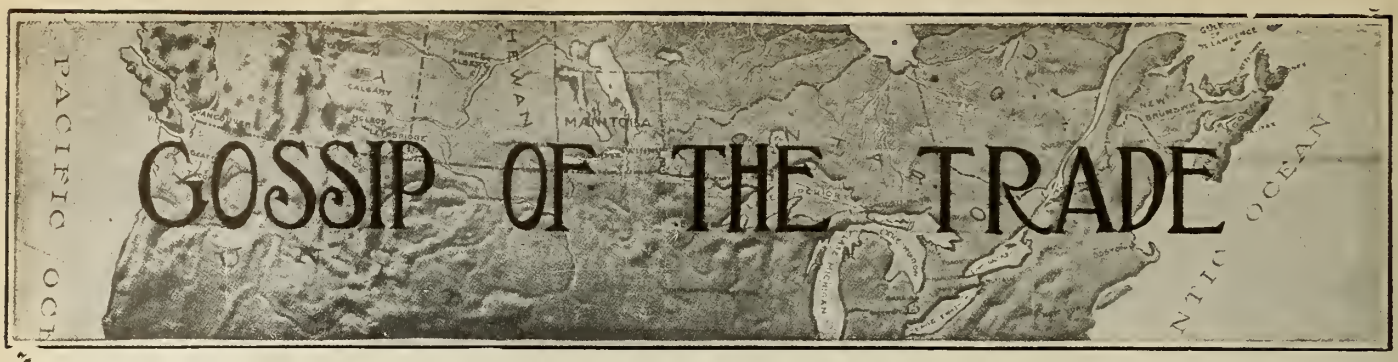
METALS.—Although the situation has improved the uncertainty as to the American Government requirements continues to be the dominating factor in the metal markets. The fear that the Government purchases at low prices will depress the market is disappearing and giving way to a more optimistic feeling. Prices this week are firmer. Tin and lead have advanced, but antimony is lower. Copper is showing more strength, but is unchanged locally and prices continue nominal.

TIN.—Tin has scored an advance and the market is decidedly firm. The price locally is now 60c lb.

LEAD.—Pig lead continues in a strong position with the Trust quoting $9.50 New York. Prices locally are slightly higher ranging from 12½ to 13½c lb.

SPELTER.—The spelter market is rather dull, and unchanged with prices locally ranging from 13 to 15c lb.

COPPER.—The copper market is firmer, and quotations locally range from 37½c to 38c lb.



A NEW FACE ON THE ROAD

The Empire Mfg. Co., of London and Toronto have secured the services of Mr. Wesley Gordon of Belleville, who is going to cover the territory recently vacated by Mr. L. F. Mayne. The latter has joined the head office staff at London as Utility man.

Mr. Gordon has been manager of the plumbing, heating and tinsmith departments for Smith Hardware Co. of Belleville for several years. He has had a broad experience in handling the above lines, and is a capable salesman, as well as being a splendid mechanic, and should prove to be a valuable addition to the already competent staff of the Empire Manufacturing Co.

Mr. Gordon will commence his new duties about May 1st. The territory to be covered by him will include Toronto east to Arnprior, and Brockville north to Cochrane, and west to Sault Ste. Marie; also Hamilton and the Niagara Peninsula.

Mr. Gordon's host of friends wish him every success in his new venture.

BACK TO HIS HOME TOWN

Mr. S. P. Gourlay, the well known plumbing merchant, St. Catherines, Ont., is soon to be joined in his business by his son, Mr. Fred B. Gourlay, who for the past eight years has conducted a successful branch of his father's business in Welland. Mr. Gourlay, junior, with his wife and son, was greeted with rejoicing on the part of their many friends on their arrival. While in Welland Mr. Gourlay became well known throughout the city and he leaves with the hearty good wish of many Wellanders.

There was a splendid gathering at the Welland Club recently in connection with Mr. Gourlay's departure when he was the recipient of a pair of handsome upholstered chairs. Everyone present had something to say about Mr. Gourlay and the remarks, while filled with compliments, were quite sincere. Mr. Gourlay's residence there has been a success both from a business standpoint and what is more important, from the standpoint of making friends.

A DISASTROUS FIRE

The night of Friday, May 11th, saw the wiping out by fire of the plant owned by the Cluff Manufacturing Co., Sterling Road, Toronto, at which premises the Vitro No-trouble tanks were manufactured. The shell plant of the Cluff Munition Co. was also demolished.

The Vitro tank plant was established nearly four years ago, and to date the output had increased materially. Several thousand tanks were crated and ready for immediate shipment, but were all destroyed.

The fire originated in the shell plant under the waving machine in the waving-room, at the north-western end of the building, shortly before 10.45 p.m.

In the waving-room stage of manufacture a considerable quantity of rosin is used, and fed by this inflammable material the flames spread with almost incredible rapidity. The night watchman at the plant immediately sounded a general alarm, which brought fire apparatus to the scene from all parts of the city, and the one hundred and ten men on the night shift made a hasty exit. Fanned by a high north wind the flames in ten minutes had enveloped the entire structure, which was of brick and one-storey in height. In less than an hour only a shell remained. One hundred and fifty munitions machines were destroyed, and 350 men are temporarily thrown out of work. There were no women workers on duty when the fire broke out, and the men workers all lost their hats and coats in their hurried exit from the building.

The fire was a spectacular one, and the flare could be seen for miles and attracted a great crowd to the scene. The firemen had ten streams of water playing on the flames within 20 minutes of their arrival.

R. J. Cluff, president of the Cluff Company, estimated the loss in machinery and other equipment at $150,000 and damage to the building and contents at $100,000. This is entirely covered by insurance. Though the loss of business cannot at this stage be estimated.

The firm was working on an order for 200.000 eighteen pounders. of which 40,000 had been delivered. Just before going to press, the SANITARY ENGINEER learned that new premises in which to manufacture Vitro tanks have been procured, and considerable material is on hand, so that there is expected to only be a few days' delay in shipments of the Vitro tanks.

A new factory will be put up at an early date, and, if possible, of a much larger capacity.

CHANGE OF MANAGEMENT

The Toronto branch of the Empire Manufacturing Co., London will be under new management on account of the late manager W. G. Foster leaving Canada to establish a plumbing, brass and supply manufacturing business in Grand Rapids. Mr. O. L. Robb of London is to be Mr. Foster's successor.

Mr. Robb has had a very extensive experience with the company, when quite a boy he started to serve in quite a humble capacity, and by hard plugging, and sound judgment he has worked up to be one of the right hand men of the firm. That his services are thus far appreciated is shown by his appointment as manager of this very important establishment.

Mr. Robb has travelled on the Eastern as well as Western field and enjoys the confidence of a large number of friends who no doubt will be pleased to note his steady and well earned advancement. The SANITARY ENGINEER joins his many friends in wishing him every success in his new position.

W. G. Foster

Mr. Foster the retiring manager of the above branch establishment is well known to the Canadian sanitary and heating trade, having been connected with the trade in Canada for over 15 years. He left his home at Grand Rapids about the year 1902, to take a position with the Canadian Wolverine Co., Ltd. Chatham, Ontario, and since that period, has labored in the capacity of Secretary Treasurer, advertising manager, sales manager, and general manager. This concern it will be remembered suffered a serious fire loss soon after the war broke out, and just one year later the plant was demolished by fire. Mr. Foster then became manager of the branch above referred to.

As stated before, Mr. Foster is about to establish a brass manufacturing plant in his home town, Grand Rapids, U.S.A.

He wishes to convey his very best respects and good wishes to the many friends he has made in Canada, and while leaving Canada to go to the home of his childhood, he said that the friends he was leaving had been to him real friends indeed, and that when he left Grand Rapids to come to Canada, he felt he had only one home, but upon leaving Canada, it felt to him like leaving one home to go to another.

FEDERAL DEPARTMENT OF HEALTH

Dr. Steele, M.P., for South Perth, is advocating that a health department should be established by the Government. Dr. Steele as a medical man, has given a great deal of study and thought to the problem and strongly believes that the time is ripe for the establishment of such a department. He has received support of his move from many organizations throughout Canada.

The question is one which was given considerable attention by the Government before the outbreak of hostilities, and if it had not been for the war a bureau would likely have already been established. In view of the many big questions on its hands it is a question whether the Government will be prepared to embark immediately on the organization of a new department, although the resolution will receive sympathetic treatment.

Dr. Steele's resolution is as follows: "That, in the opinion of this House, the efficiency of the nation depends largely on the physical condition of the people and in order that the latter may be conserved in the largest possible measure, there should be organized a separate department of the Government, having supervision over all matters relating to the physical welfare of the people of the Dominion."

STRAIGHT TALK TO THE CRAFT

(Continued from page 18.)

there will not be any relief until the new accomplished fact, a body of men who had really done something—the result of real work.

Mr. Young's report however at this stage was handed over to the resolution committee, a right and proper thing to do, and the following is the report made by that committee. Mr. Geo. S. Dorman (in the chair) read the report:

Your resolution committee, having considered the correspondence, find that the following matters in order of importance require the careful consideration of this meeting:

The president's report—section 1, and his suggestion of the formation of a western branch; also that the national be an executive body only, recommended by President Young.

"That the constitution and by-laws be amended to comply with this and that the secretary of this body be located in the central part of Canada. This executive body to deal with all matters of importance relating to the Dominion as a whole and chiefly with our relations with the supply houses and manufacturers; that this executive body consist of the presidents of the different provinces, who shall elect their own officers and nominate a member to represent all unorganized units.

Section 2.—Re western branch. If western branch, Maritime branch and central branch are found expedient, their formation shall be subject only to the Canadian executive body.

Section 3.—Re model by-laws for the Dominion.

Suggestion that the association take this matter up, taking into account that the matter is distinctly provincial, coming under each provincial board of health, and that the Canadian Executive can perform a duty in endeavoring to harmonize the legislative actions of each province with the ultimate prospect of greater uniformity, and we note with pleasure the formation of a western branch with this idea in view, but suggest that sanitary engineers and inspectors only should be involved in this, as we cannot see where supplymen are interested.

It will be seen by the above that the report from Mr. Young was considered by the resolution committee in no small way, and after other reports were received and gone over, the various reports were discussed openly by the whole of the members present. These discussions will be considered at a later date.

(Continued in next issue.)

PLUMBING DIVISION

In connection with Winnipeg Plumbing Department.

Permits issued	79

Inspections.

Water tests	24
Smoke tests	80
Subsequent inspections	286
Miscellaneous inspections	25
Defects rectified	115

SEWER DIVISION.

Permits issued	11
Connection constructed	11
Inspections	54

Flushings.

Tank flushings, gallons	657,408
Hose flushings, gallons	206,875
Total gallons	864,283

The above shows the work of the Winnipeg plumbing department for the month of April. It will be noted that the major portion of the work is that of keeping the city in a fit state of health.

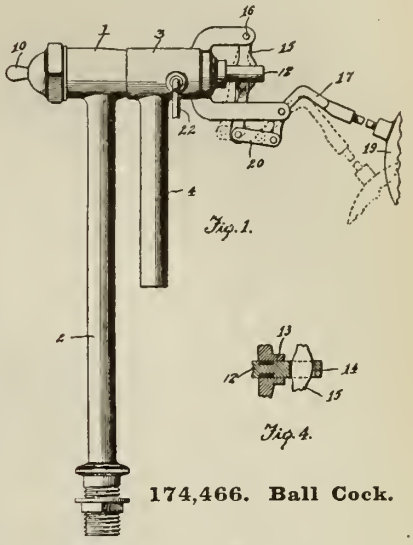
New Patents

No. 174,466.

John J. Cunningham, Gadsden, Alabama, U.S.A., 16th January, 1917; 6 years.

Filed 2nd November, 1916. Receipt No. 271,546.

Claim.—1. A ball cock comprising a supply pipe adapted to be secured in the flush tank and the upper end of which terminates in a hollow transversely extended member having one end screw-threaded and having an internal concentric restraint neck located opposite the outlet of the supply pipe and having a valve seat at one end, a member



174,466. Ball Cock.

screwed to one of the screw threads, the interior of which is in communication with the interior of the first-named member and provided with an outlet pipe, a valve stem slidably supported therein, a lever and float mechanism for moving the latter, and a valve secured thereon in position to automatically seat itself upon the valve seat or the re-entrant neck.

2. A ball cock comprising a supply pipe adapted to be secured in the flush

(Continued on page 28.)

LETTERS TO THE EDITOR

Editor, SANITARY ENGINEER:

Dear Sir,

I have no doubt but that you will be surprised to learn that at this late date of sanitary knowledge, that we have amongst us in the City of Fort William a party who is connected with Board of Health matters, who advocates the abolishing of back or reventing of fixture traps in a plumbing installation, as not only an unwarrantable waste of money but that reventing serves no useful purpose.

Personally I think it is needless to comment on the said party's knowledge (or rather lack of it) of sanitary engineering, such suggestions certainly go to prove that he either never had any applied sanitary engineering training or else he belongs to a generation now dead, yet it is just possible he may have got his own little ideas of village installations in some other climate than Canadian, he certainly never got them in the North American continent. (A little knowledge is a dangerous thing).

To my mind it is criminal not to take every precaution to prevent syphonage of trap or sewer gas pockets in a system, and this can not be done except by back venting every trap, or have the traps on the better system of what is known as the continuous waste and vent principle.

But as you are well aware that the majority of the public do not understand such matters, and dollars and cents count with them even if they get a cheap and nasty job, and one that is a menace to health, but they should be protected against themselves.

Yours truly, J.J.C.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHAT SHOULD I CHARGE?

Editor The Sanitary Engineer.

I am going to ask a favor of you in the way of information regarding prices I charge for plumbing repair work.

For instance, I pay in Toronto $1.10 for a stop and waste cock, $1.98 for a 4-inch lead bend, $10.50 for a 3-gallon range boiler.

I have asked the jobber what a fair retail price for these goods should be, and have been informed that I should add 20 per cent. over cost plus freight, but such a price does not appear to be anywhere near the mark, after allowing overhead expenses, freight, cartage, etc.

What do you consider a decent profit?

I notice in our city that hardwaremen, dry goods merchants, furniture dealers, druggists, grocers, lumbermen, coal merchants, etc., are in a position to have fine brick houses built for themselves, ride in automobiles, make trips to the South for the winter, and I am sure they are not doing it on 20 per cent. on cost.

It looks to me as though they never sold under 60 per cent. on and mostly 100 to 200 per cent. Any information you can give me along these lines will be very much appreciated.

R. A. S. P. A.

Our readers will note by the above question that our correspondent does not give us any idea of his overhead expenses, and we take it that he is being ill-advised by the jobber if he is told to merely charge 20 per cent. on cost plus freight, if the jobber means freight plus invoice cost. On the other hand, the jobber could scarcely mean 20 per cent. plus overhead, freight and invoice. This would be extortionate, and to give our inquirer a clear, straight figure as to what he would require to charge on the articles named, we would require to know what his overhead cost is.

However, here is as near as we can get to the price we would advise should be charged, and the method to adopt. We will have to assume a figure for overhead and profit, and might explain that out of several hundred inquiries regarding overhead expenses it has been proved that no business could be run on less than 13½ per cent. overhead, whereas the average was 18 per cent. Now, let us take the range boiler at $10.50 with 70 cents freight, and let us suppose that our friend's overhead is 20 per cent., slightly over the average; let us also suppose he wants 10 per cent. profit, and if every item of overhead is really included as it should be, 10 per cent. would not be a bad profit. But do not, as we have often warned our readers, confuse your own salary, or that of your daughter, son, or wife (if they are helping in any way) with profit. Do not think that if one of your family is assisting you that their services should not be paid for. Therefore, we will assume that all salaries that are non-productive, that is, that cannot be charged for on an account and cash received for same, must be included in overhead expenses; that 20 per cent. covers all freight cartage, rents, insurance, telephone, stationery, postage, etc., etc., and that a clear 10 per cent. profit is wanted. We will add the freight charge, viz., 70 cents, which brings the cost of the range boiler at destination to the sum of $11.20. Now, $11.20 is equal to 70 per cent. of the selling price; 20 per cent. overhead makes 90 per cent. plus 10 per cent. profit, making 100 per cent. the actual selling price. Now, while we have explained this method many times, it will do no harm to again repeat it here.

In all businesses there are three headings which must be taken up to complete a business transaction, viz.:—First, capital cost, or invoice plus freight; second, overhead; third, profit; and if invoice plus freight in this case of the range boiler amounts to $11.20, being 70 per cent. of the selling, then 1 per cent. will be exactly 16 cents, and 100 times 16 cents equals $16; so that the retail sale price for this would be $16.

The stop cock and the lead bend can be figured out in the same way.

There is only one more matter which the writer would urge upon every business man—that is, do not think that by letting your daughter, your son, or your wife assist in your business, you are keeping overhead expenditure down, because you are not; the expense is there, but you are not paying it; and whether you pay it or not is a matter of your own. You should at least make a charge to your business for it, and take out that amount when circumstances permit, though that is a very risky business.

You could not get a stranger to do work on the same basis, and surely you will not allow your business to exploit your own flesh and blood; at best you are loaning these loved ones of yours to the manufacturer and jobber, assisting him to dispose of goods, and he does not want such a service. He wants to see better business men, doing business on proper lines.

Regarding the remarks of our reader with reference to hardware men, dry goods merchants, coal merchants, and the like, we must not forget that these men are merchants; they make their merchandise procure profits by selling them at advanced prices. These men know more about the regular rules of merchandising than the average sanitary and heating engineer. He is a mechanic, and up till recently has been more interested in solving problems of a mechanical nature. But we hope to see the day when every sanitary and heating engineer will realize that to be a success in this trade he must be a good mechanic, and a business man. The bulk of his business is that of service, and he has not yet fully realized how he must charge for it.—Editor.

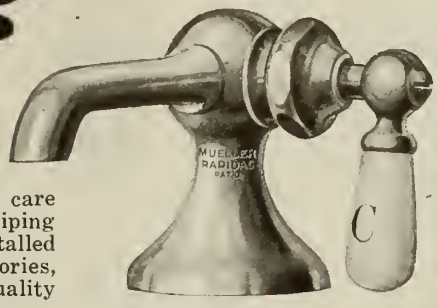
NEW PATENTS

(Continued from page 27.)

tank and the upper end of which terminates in a hollow transversely extended member screw-threaded at both ends and having an internal concrete re-entrant neck located opposite the outlet of the supply pipe and having a valve seat at one end, a member screwed to one of the screw threads, the interior of which is in communication with the interior of the first-named member and provided with an outlet pipe, a valve stem slidably supported therein, a lever and a float mechanism for moving the latter, a valve secured thereon in position to automatically seat itself

IN A CLASS BY ITSELF

MUELLER
Rapidac



Just Read This—

When you have exercised all the care possible in the laying out of the piping in a building; when you have installed the fixtures, such as Baths, Lavatories, Sinks and Laundry Tubs, be the quality or design the very best;

You can make the whole installation poor by attaching poor brass goods.

Mueller Brass Goods improve the poorest fixtures. Make both appearance and lasting service a certainty.

Raise the standard of your work by installing this high-grade line. There are only a few dollars difference in price, on an entire house job.

You make no mistake. We can prove the assertion by the fact that some of the largest as well as smallest concerns in Canada use exclusively the Mueller line of High-Grade Brass Goods.

Mueller Brass is in a class by itself. It has no real competition.

Fully Warranted

H. Mueller Mfg. Co., Limited

SARNIA ONTARIO CANADA

Makers of High-Grade Water, Plumbing and Gas Brass Goods, and Jobbers of General Plumbing Supplies.

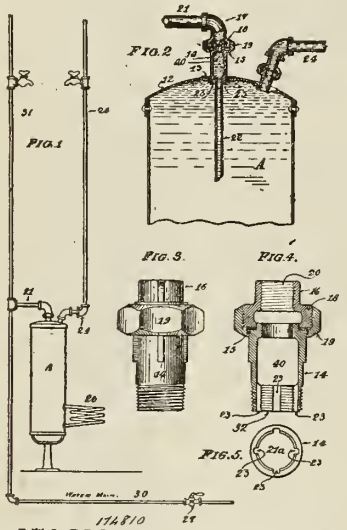
upon the valve seat on the re-entrant neck, and a cap removably secured over said valve and having a recess therein which receives the end of the valve stem to assist in guiding and centering the latter.

No. 174,810.

The Illinois Malleable Iron Company, assignee of John R. Steneck, both of Chicago, Illinois, U.S.A., 30th January, 1917; 6 years. Filed 22nd November, 1916. Receipt No. 272,213.

Claim.—1. In a hot water system, a stand boiler a circulating coupling connected to said boiler, said circulating coupling comprising a male piece, a tail piece, and a coupling nut constructed to separably connect said male and said tail pieces, said tail piece having its lower end reduced in diameter and its lower terminal internally screw-threaded, there being in the terminal portion of said tail piece internal screw threads and a series of grooves cut through these threads.

2. A circulating boiler coupling comprising in combination, a male member, a tail piece, and a coupling nut on said tail piece to connect said tail and male pieces, said tail piece having at its



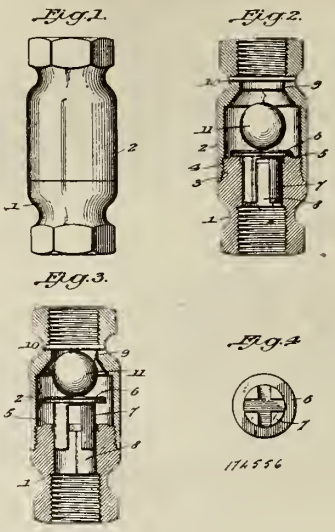
174,810. Boiler Coupling.

lower terminal an internally screw-threaded bore, there being in said bore a series of grooves or indentations, and a discharge pipe constructed to engage the internally screw-threaded portion of the tail piece, whereby said grooves afford passages past the terminal of said discharge pipe into the bore of the tail piece, said grooves being formed in the tail piece by removing portions of the internal screw threads and part of the interior wall of said tail piece, there being an enlargement in the bore of said tail piece in which said grooves terminate.

No. 174,556.

George E. Hitchcock and Raymond S. Haligan, assignee of a third interest, both of Flint, Michigan, U.S.A., 16th January, 1917; 6 years. Filed 24th November, 1916. Receipt No. 272,379.

Claim.—A check valve comprising two parts, internally bored and screwed together with threaded orifices at their outer ends, one part having a valve seat, a valve slidable in the bore and adapted

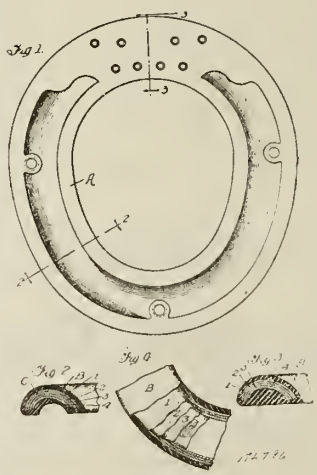


No. 174,556. Check Valve.

to rest normally upon the seat, a ball confined within the check valve and adapted to reseat the valve, and a pin extending across the bore of one part to limit the outward movement of the ball and valve.

No. 174,796.

The Brunswick-Balke-Collender Company of Canada, Limited, Toronto, Ontario, Canada, assignee of Michael James Whelan, Muskegon, Michigan, U.S.A., 30 January, 1917; 6 years. Filed 19th May, 1914. Receipt No. 238,956.



No. 174,796. Closet Seat.

Claim.—A closet seat having a wood core consisting of a plurality of concavo-convex laminations, successively decreasing in width and nested together, and an integral covering of hard rubber entirely surrounding said core and vulcanized to the entire surface thereof.

PURO

(MADE IN CANADA)

Every minute counts in getting maximum fficiency.

Our Puro Sanitary Drinking Fountains positively save 60% in drinking time, besides 35% of water ordinarily wasted. Can you afford to run your plant and lose and waste this money in old-fashioned drinking methods?

EFFICIENCY IS PATRIOTISM



Ask your efficiency expert to figure this out and you will find that:

500 men drink, say, twice a day. Under old conditions it takes between 3 and 5 minutes per man, twice a day. With PURO cutting the time in half, it would save from 1,500 to 2,500 minutes per day at an average wage of 20c per hour. The saving would be from $5.00 to $8.50 per day.

How long would it take to pay for installing our fountains?

NOW IS THE SEASON TO THINK OF YOUR WATER PROBLEMS.

ASK OUR EXPERT ADVICE.

Puro Sanitary Drinking Fountain Co.
147 University Ave., TORONTO, CAN.



Vent Caps

Cleaning screws, and drain checks, prevent flooding. Machinists, Brass Finishers and Plumbers specialties.

MALCOLM and COMPANY
64 Lombard St., Toronto

The Sanitary Engineer is a moving stock room. Take a look through the stock.

FOR SALE

FOR SALE—PLUMBER'S STOCK IN TRADE, including stocks, dies, smoke testing machines, tools, fixtures, pipe and fittings. Mrs. Milson, 1233 College St., Toronto.

Quick Hot Water at a Big Saving of Gas

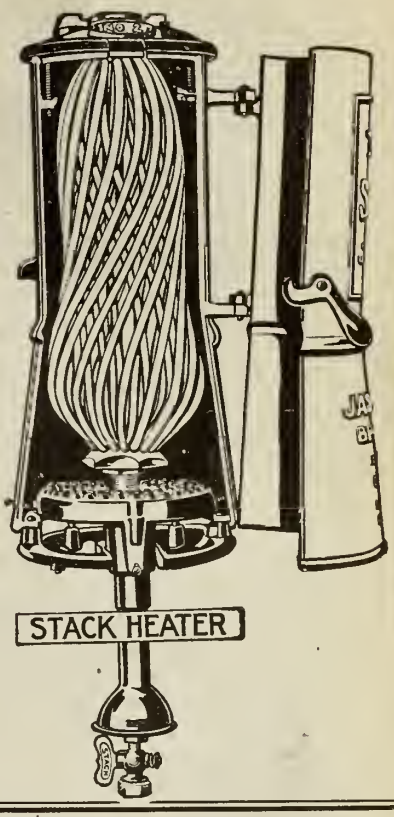
ONE MINUTE AFTER THE

Stack Gas Water Heater

IS LIT IT GIVES HOT WATER AT THE TAP

This is actually the most durable and long-lived Copper Coil Gas Water Heater made—it is the easiest and quickest to instal.

Costs but little more than the ordinary heater, but the extra cost is quickly covered by the savings effected.

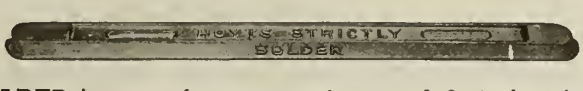


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James Morrison Brass Mfg. Co., Ltd.

93-97 ADELAIDE STREET WEST, TORONTO

Our Mixed Metal Sales Amount to Over $5,000,000 Annually



HOYT'S WIPING SOLDER is as perfect as experience and first class ingredients can make it. As only one perfect Wiping Solder can be made we manufacture only one grade, which must necessarily be Hoyt's high standard of quality.

Special attention is called to our Bar Solders, Wire Solders. Lead Pipe, Waste, Traps and Bends. Your orders will have prompt and careful attention. not sometimes—but all the time.

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y.; London, Eng.; St. Louis, Mo.



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

The Cost of Selling

SCARCELY necessary, is it? to protest that you must spend some money, much or little, to keep yourself and your merchandise known to your customers and should-be customers.

This you admit, but—DO YOU FOLLOW CLOSE UP THE LEAD OF YOUR CONVICTION?

Are you spending the money?

Let's look at the cost of close-up work in

The FARMER'S MAGAZINE

A half-page 12 times will cost you $367.20 ($30.60 per insertion). A full page, $714.00 ($59.60 per insertion).

Not a heavy annual cost to canvass the choicest class of farmers in this country—farm homes of greatest prosperity, progressiveness and capacity.

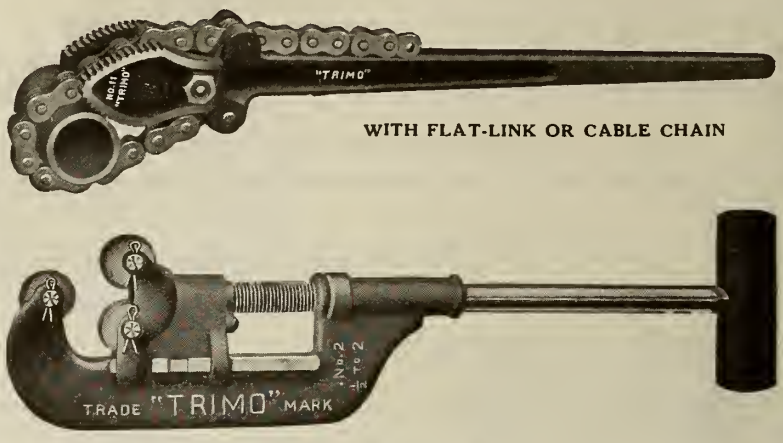
But—are you keeping a salesman always on the job?

You should—and can, at so low a price.

Write in about it.

World-Famed Specimens of the Age of Steel

TRIMO



WITH FLAT-LINK OR CABLE CHAIN

TOOLS

Send for Catalog No. 91

MADE BY

TRIMONT MFG. CO., 55 Amory St., Roxbury, Mass., U.S.A.



HEAVY EXPANSION TANKS

Last for Generations

MADE OF THE SAME MATERIAL AS STANDARD GALVANIZED RANGE BOILERS

Recommended by all Expert Heating Engineers

MANUFACTURED BY

TORONTO HARDWARE MFG. CO., Limited

We Also Manufacture a Full Line of Cast Iron Soil Pipe and Fittings.

"B & C"

COMBINATION

Floor and Ceiling

PLATES



No. 10 Steel
3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

Send for catalog of complete line.

MANUFACTURED EXCLUSIVELY BY THE

Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:

W. H. CUNNINGHAM, 98 Kingswood Rd., Toronto, Canada.

IT IS IMPORTANT!

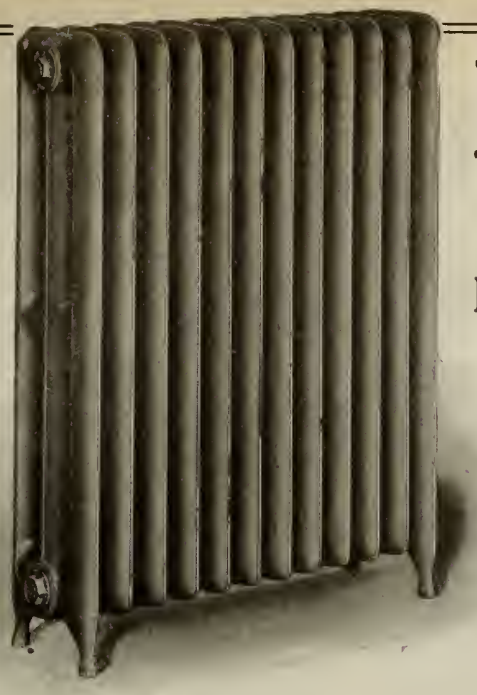
If you have something to dispose of in goods or service that as many buyers as possible get to know you and your product. This can be accomplished through

Sanitary Engineer

143 University Avenue, Toronto

Advertising makes for a better product—

Not only does advertising create a good impression regarding the product advertised but it **makes for a better product.** There is added responsibility and written-printed claims to substantiate.



IMPERIAL RADIATION

Represents the Most Advanced Method of Heating

Years of experience and research have resulted in the production of a radiator that embodies all that is known to the science of modern methods of heating.

The Imperial Radiator is designed to assist free circulation of water—smooth inside to avoid unnecessary friction.

Has been giving utmost satisfaction for years. Those who know it say that it gives off more heat per square foot than any other make. You are SAFE when you decide in favor of the "IMPERIAL."

Write for Prices

STEEL AND RADIATION, LIMITED

Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

HEAD OFFICE: Fraser Avenue, TORONTO

FOR ALL HEATING INSTALLATIONS SPECIFY KING HOT WATER BOILERS AND RADIATORS.

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Trimont Manufacturing Co. 32
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Wallaceburg Brass Mfg. Co. 4



"How Much Should I Charge"?

How much time do you spend, Mr. Sanitary Engineer, deciding what you shall charge for a closet seat—a ball cock—a tee—a nipple or a hundred other articles sold every day?

Use My Resale Price Service

(Protects Your Profits—Saves Time)

Figuring resale prices is my specialty. I have had 10 years' experience as Business Manager of one of the most successful plumbing concerns in Western Ontario. My special system of watching the markets and sending out price changes assures you of a reasonable profit.

Firms now using this system would not be without it for five times the small fee I charge.

Don't Guess at Prices—It's Risky These Days

Think of the time and money you could save by simply referring to an up-to-date resale price list. How many times a day could you use it? Think, how much more business like it looks to your customers. You have not the time or facilities for watching the markets and making price lists. That's my business. Let me assure your profits.



IT COSTS NOTHING TO INVESTIGATE

Mail This Coupon

Making Money

Does not mean procuring a big volume of business.

It depends on the prices you charge.

You receive no thanks for selling goods too cheap.

It's just as easy to procure a reasonable price.

I WILL GUARANTEE PROFITS

C. D. HENDERSON, P. O. Box 123, Brantford, Ont.

Send me particulars about your PRICE SERVICE:

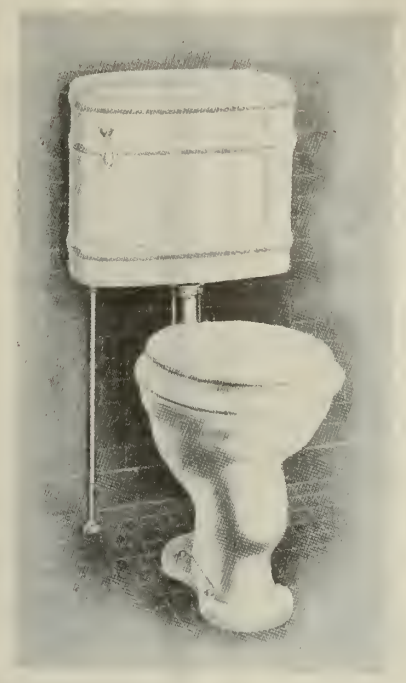
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— NO OBLIGATION — SIMPLY AN INQUIRY —

Pfau's NEW BIG "Mercuroid" Tank

No. 4-M



The "Beau Brummell" of the "Whites"

QUALITY AT NO EXTRA COST

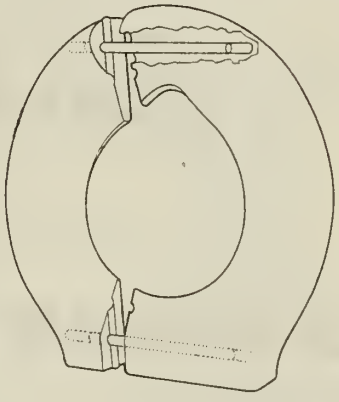
Made of non-rusting white alloy, specially blended—light in weight—tough in texture, not affected by chemical actions of water.

PFAU'S WHITE IVORY FINISH is unequalled for beauty and service. *Guaranteed not to chip, crack, craze or peel.*



Pfau Trimmings

are of uniformly high quality. *The Elevated Ball-cocks* will work equally well on either high or low pressure, and are more nearly noiseless in operation than any other ball-cock now on the market. The *Flush Valve* is extra heavy, has 1¼" overflow tube with ¾" space between it and the rubber ball, which affords ample room for the natural expansion of the ball.



Specify "Mercuroid" Tanks and Pfau Seats on your next order. Your jobber can supply them.

PFAU MANUFACTURING CO.

CINCINNATI, OHIO

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W. H. CUNNINGHAM, 98 KINGSWOOD ROAD, TORONTO



Beaver Die Stocks

Full Thread at One Cut

with the

"Beaverette"

A Compact and Complete Tool

NO CHANGING OF DIES—NO BACKING OFF—NO LOOSE BUSHINGS. These are some of the advantages of the "Beaverette" not found in any other tools. Cuts from ⅛ to 12 inches.

One man can cut a 12-in. thread easily with our tool.

Beaver Pipe Cutters



Make a square, clean cut, and leave no burrs. There's less friction on hot water jobs and less wet steam on steam jobs when the Beaver square-end pipe cutters are used.

Manufactured by

The Borden-Canadian Co.
Toronto, Canada

"BEAVER"

Every Sanitary Engineer

Should Make A Practice of Stocking and Selling

A Select Line of

Modern Gas Appliances

There is money to be made if the proper development of the sale of gas appliances is carried on.

Gas Water Heaters particularly appeal to plumbers and sanitary engineers, because there is a certain amount of piping work to be done with each, and the installation of one Gas Water Heater almost invariably leads to the sale of other gas appliances.

We are ready to advise on the correct procedure necessary to make this end of your business profitable, and are always ready to co-operate in work which tends to help the gas industry generally.

For further particulars apply to

The Consumers' Gas Co'y.

12-14 Adelaide Street West, - TORONTO
Phone Adelaide 2180

WROUGHT PIPE

BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized
All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

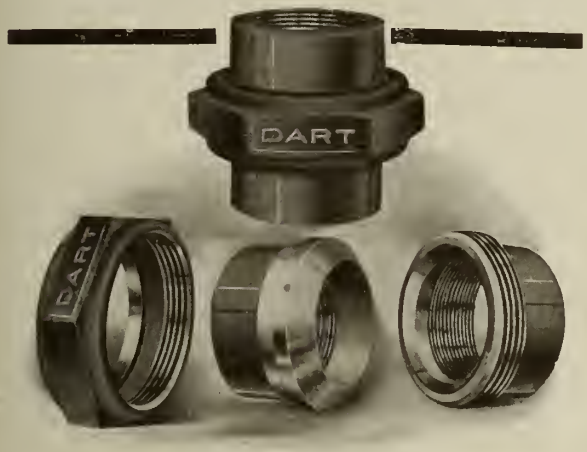
Montreal Works: Lachine, Can.

Mutual Benefit Chats.—No. 2

MR. SANITARY ENGINEER, are you reading our articles on bookkeeping? If you are not, you are losing one of the best opportunities offered you for some time. Any man in business must of necessity know whether he is on the debit or credit side of the ledger, and the only way he can ascertain this correctly is by a system of bookkeeping. We are offering to our readers a system so comprehensive yet so simple that any man who can read will readily understand it. The large number of descriptive illustrations elucidate quite clearly this system which we are giving our subscribers. This is only one of the many features which the readers of the Sanitary Engineer are getting.

Read your copy from cover to cover and procure all the assistance derived therefrom.

The Part of a Pipe Line That Never Leaks



DART UNION PIPE COUPLINGS

are permanently efficient

BECAUSE

Both Faces are Bronze

No Deteriorations

Iron Parts are heavy

No Stretching or Pulling Apart

And they are easily connected whether pipes are in or out of line.

Dart Union Pipe Couplings never bother customers and they save you much time, labor and worry.

There is a "Dart" for every need.

YOUR JOBBER SELLS THEM

Manufactured by

DART UNION CO., Limited

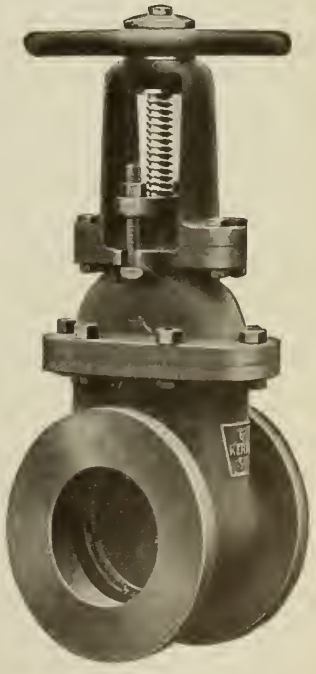
Toronto, Canada

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

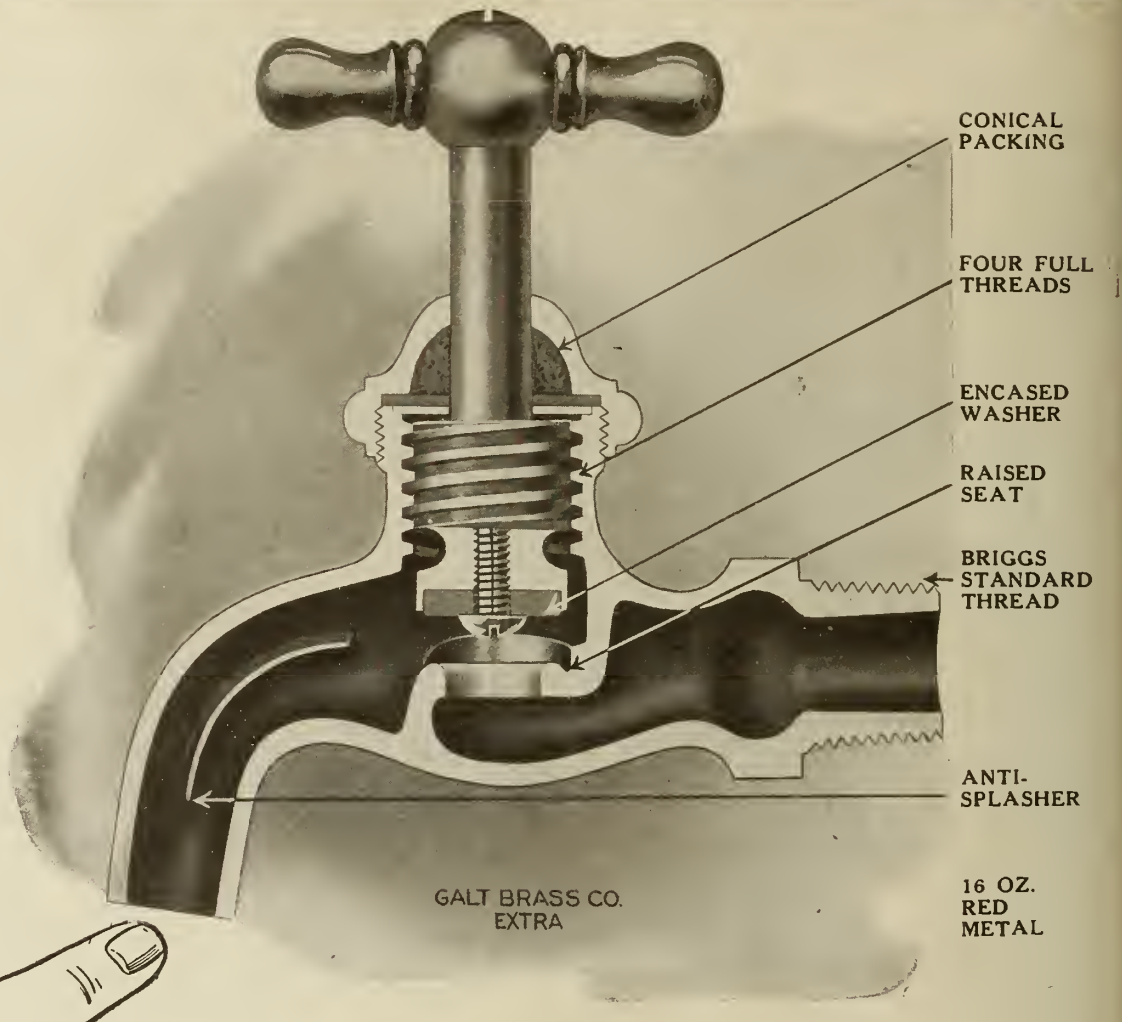
Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

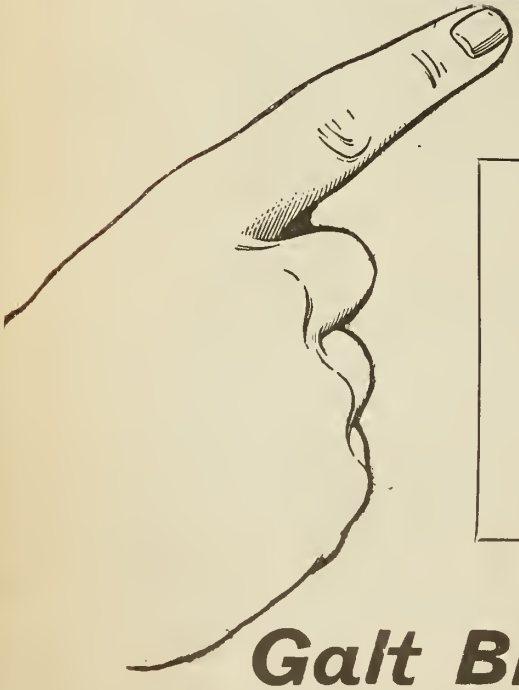
Approved by the Fire Underwriters Association, and Registered by Boiler Inspection Departments of Ontario, Saskatchewan and Alberta.

THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Registered **PERFECTO** Trade Mark

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, JUNE 1, 1917 | No. 11

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FULL WEIGHT METAL

EMPIRE VALVES

EMPIRE VALVES

Are Full Weight Through and Through

Some valves look good, but they lack the weight to make them substantial. Empire valves have the substance that gives long life and ability to stand hard usage.

Accurate Threads

Globe and Angle



The first opportunity that presents itself to examine a valve bearing an Empire "E," notice the close-grained metal it is made of—it spells quality to the experienced eye. Empire quality stands for dependability.

Every Empire Valve is accurately threaded.

Every Empire Valve has a large, clear opening.

Every Empire Valve is constructed to give unbeatable service.



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Empire Mfg. Co.
LIMITED

LONDON ONTARIO - TORONTO ONTARIO

TIP-TOP QUALITY

VALVES

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

ONTARIO:
Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

New Address:
201 Inspector St.
MONTREAL



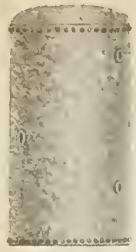
Telephone
No.
Main 5447

Canadian Consolidated Rubber Co., Limited

Announce the removal of their *Executive Offices* and the *Sales Department* of their *Montreal Branch* from Notre Dame Street East and Papineau Square to

THE RUBBER BUILDING
201 Inspector Street
MONTREAL

This central location, being more convenient, will increase the facilities for a better and quicker service to the trade when in need of anything in rubber.



HEAVY EXPANSION TANKS

Last for Generations

MADE OF THE SAME MATERIAL AS STANDARD GALVANIZED RANGE BOILERS

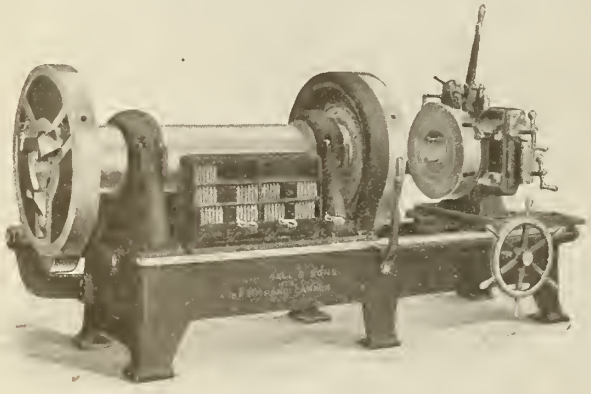
Recommended by all Expert Heating Engineers

MANUFACTURED BY

TORONTO HARDWARE MFG. CO., Limited

We Also Manufacture a Full Line of Cast Iron Soil Pipe and Fittings.

Pipe Machines of Merit



THE HALL No. 8

Duplex Improved Gear Box Driven. Capacity 2½ in. to 8 in. inclusive.

Note the drive belt at rear out of operator's way. Elevated die cabinet, control lever and speed levers all convenient to operator's right hand. Sliding die head.

These machines are equipped with a friction clutch, enabling operator to revolve pipe a few inches, if necessary.

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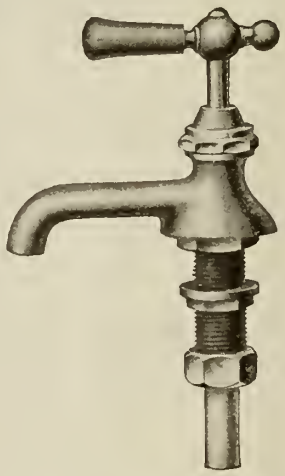
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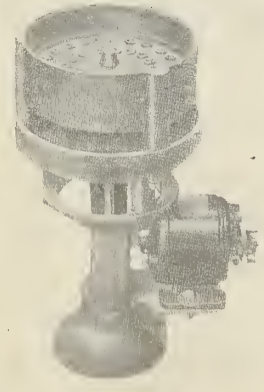
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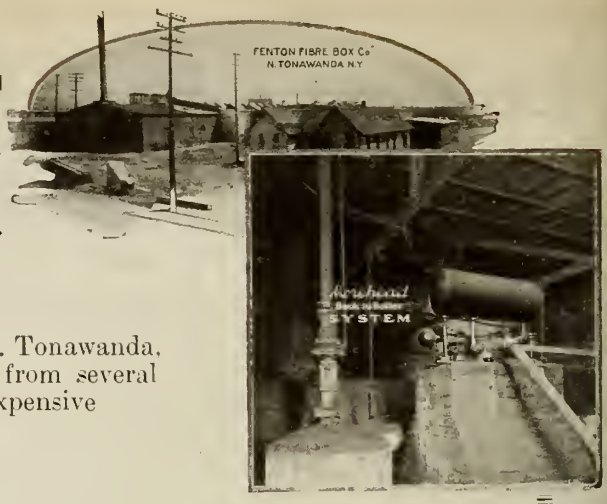
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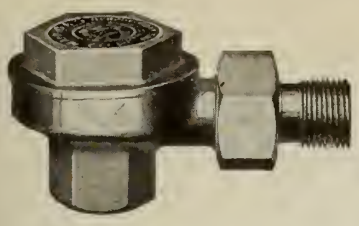
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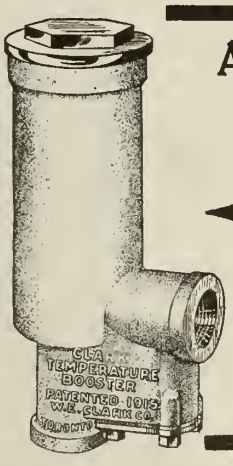
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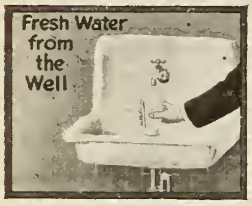
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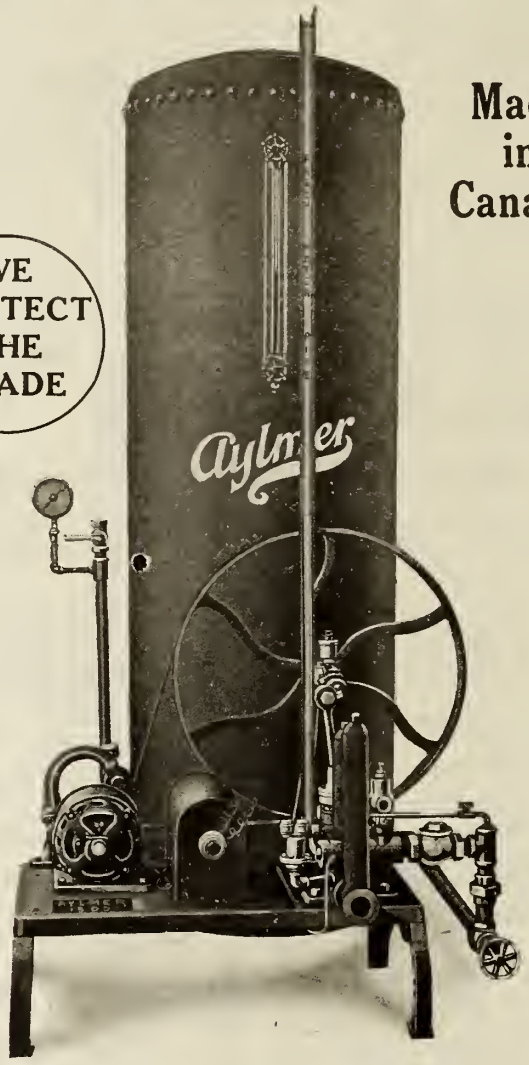
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PLUMBER AND STEAMFITTER OF CANADA

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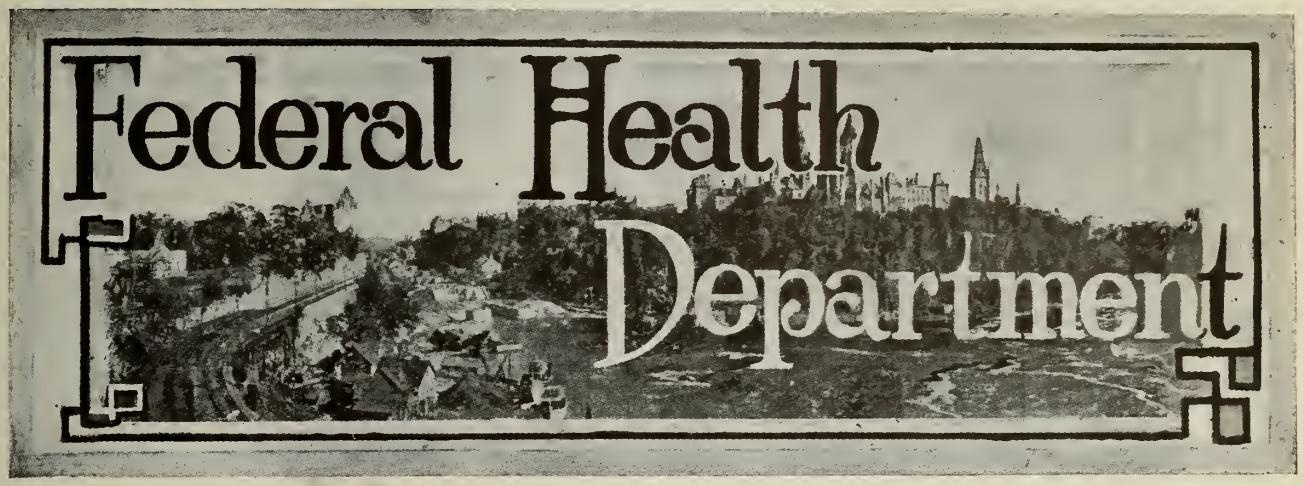
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THE SANITARY ENGINEER

VOL. XI JUNE 1, 1917 No. 11



Extracts From a Bill Put Before the House of Commons at Ottawa, May 2nd, 1917, by Dr. Michael Steele—Sanitary and Heating Engineers Should be Interested in This Bill From an Engineering Standpoint.

WE doubt very much if there was ever shown in a more convincing manner the need for a Federal Department of Health, than when Dr. Michael Steele, M.P.for South Perth, put his bill in favor of such a department being organized, before the House of Commons on May 2, 1917.

He showed in very forceful figures what was being neglected. He proved in his way the need of a Federal department of health, and except for a few very feeble questions put forth in a more or less querulous manner, there was not a dissenting voice heard. Later on some of the Ottawa newspapers indulged in a little criticism all their own, but if a movement will not bear even harsh criticism it cannot hope to result in universal advantage.

But, if Dr. Steele convinced his hearers in his own way of the need of a Federal Department of Health, how much more convincing would his bill have been had he been supported by the voice of that great army of ours, the sanitary and heating engineering profession?

We must give credit where credit is due, and the medical fraternity do deserve no end of praise for the work they have done, and the progress made along the lines of medical and surgical science, the latter science, however, should not be classed in the same group, because it is based upon greater actual skill and cleanliness than is the medical.

The following is an excerpt from the bill put before the members of the House which followed a short introduction.

"It is perhaps no exaggeration to say that at no period of our history has the prevention of disease and the physical welfare of our people occupied so large a place in the thoughts of every intelligent community as obtains at the present day. This has been accentuated by the present war in Europe. Prior to the outbreak of war there was much evidence of the progress of sanitary science and of the satisfactory results therefrom. We had seen typhus fever, cholera, and other less acute disease practically exterminated in civilized nations. We had seen the rate of mortality from typhoid, smallpox, scarlet fever and others vastly decreased. We had seen the rate of mortality in England and Wales reduced from 21.4 per 1000 to 14.6 per 1000 in the last fifty years thus saving the lives of 345,000 people each year.

But the war has furnished some remarkable examples of the value of sanitation and medical science. Instead of thousands of our brave soldiers dying from typhoid, as occurred in all previous wars, and tens of thousands being afflicted and rendered useless by the same disease, we find that by the efforts of medical science typhoid in the army has been practically exterminated so much so that in the year 1915 in the great British army, including the forces from the overseas dominions, only some 46 cases of typhoid occurred. Let this House imagine, if they can, the increased efficiency of the Army on this account. Dr. W. Osler's opinion is that if inoculation against typhoid in the armies were universal it would increase the efficiency of the forces by one-third. Not only typhoid but cholera and tetanus, the greatest enemies of the British soldier in all previous wars, are beaten for all time to come. Not only this, but the death rate from sickness in the millions fighting under the Union Jack, has been less than the rate of mortality among men of military age remaining at home. When a man joins the army he is taught how to live."

The above arguments first of all bear testimony to the value of sanitation. No doubt Dr. Steele had in his mind all matters appertaining to the work of sanitarians, medical and mechanical. He would never for one moment try to prove that disease is stamped out by cures. He then speaks of the opinion of Dr. W. Osler regarding inoculation, but even so, inoculation has been proved time and again to be unnecessary if preventative measures had been in operation. All the diseases for which some of our medical men recommend inoculation are preventable, and the work of sanitary engineers is to prevent them.

Dr. Steele mentions that there are less deaths from disease on the firing line than in our civil population. What does this statement prove? Simply that stricter measures regarding cleanliness are enforced in the army than is the case in civil life.

He said, "When a man joins the army he is taught how to live." We may add, "But he is elsewhere allowed to live in hovels, pest houses, build cesspools, pollute drinking water, build houses with no provisions for ventilation, and ruin his own vitality, thus becoming a menace to those who perforce must live near him." Why? Because we have no Federal Health Department. No uniformity, and a host of weak-kneed provincial health departments, who have all kinds of laws, but seldom if ever put them into force.

Another part of Dr Steele's speech will no doubt interest our readers, particularly that which refers to diseases of a communicable nature.

Let me speak now of communicable diseases. The suppression of these diseases should be made a state problem, because they

attack the citizenship of our country. We are ready, prompt and effective in resisting the foe from without, but, I fear, indifferent and negligent in our resistance to the greater foes within. Someone has said that these diseases are the children of a nation's ignorance and neglect. Protection against communicable disease is as important as protection against larceny or incendiarism, assault, or even murder.

It is estimated that there are in Canada every year at least 50,000 deaths which could be prevented. These deaths are caused by polluted water, impure and adulterated food and drugs, epidemics, various preventable diseases such as tuberculosis, typhoid, etc., unclean cities, and bad sanitation in our homes. Fifty thousand people dying each year whose lives could be saved—and this Parliament gives scarcely a thought to it. If 50,000 people, half the population of Ottawa, were destroyed, say, in one day by some terrible calamity, would we not take notice of it! There are in Canada 500,000 cases of preventable disease every year. If we should read in the press to-morrow morning that the whole population of Montreal was stricken with some disease, would we not wake up and take action? Yes, 50,000 of our people are needlessly dying every year. 500,000 are suffering from illness which can be prevented, and $100,000,000 or more is being lost every year—and still we give no heed.

This leads me to speak of the vast economic loss to the workingmen of the country through sickness, and again I am compelled to use statistics from the United States, because we have none dealing with the matter in Canada. The report of the Committee on Industrial Relations appointed by Congress made a very searching investigation of this subject and said that each of the thrity million workmen of the United States were losing on an average nine days work each year from sickness. This meant to them a total loss of $680,000 annually. From sickness unemployment results, and from this follow further distress, destitution and disease. All charitable organizations testify that a very much larger percentage of the cases that apply for assistance are driven to them by sickness than by unemployment. The economic evils of sickness are recognized so generally that numerous remedies have been advocated.

The above quotation is a direct call to sanitary and heating engineers. It distinctly says that, "at least 50,000 deaths are caused by *polluted water*, impure and adulterated food and drugs, various preventable diseases such as tuberculosis, typhoid, etc., *unclean cities, and bad sanitation in our homes.*" And yet we have homes planned by architects ignorant of the laws of health, providing no means for proper ventilation, etc. We have provincial health departments allowing towns and villages to spring up and become little better than big cesspools. We have speculative builders putting in cheaply gotten-up plumbing fixtures which become more of a menace than a sanitary fixture in a very short time. We have no laws governing the heating of our homes. All these things cause diseases to generate in our midst and unless there is something done to put into force a Federal health law, supervised by practical men, mechanical as well as medical experts, we shall go on generating and degenerating, and end as Athens did, as Carthage did, as Rome did, or be visited with a plague as was old London.

Just imagine, readers, 50,000 people lose their lives in Canada every year as a result of uncleanliness and insanitary surroundings.

At that rate the whole population of the city of Toronto and a number of surrounding towns would be wiped out in 10 years. What are we sanitary engineers to do in the matter? Are we to be heard, or are we to be satisfied to put in what the jerry speculative builder bids us, or the architect, or the owner who know nothing of value but whose one consideration is "cost"?

No we must be heard. We must be up and doing We must lend a ready ear to this bill before the House, and see to it that we and our work become a part of it. It is a responsibility which we can shoulder with lasting credit to ourselves and our fellow men.

The first gentleman to speak on the matter in the House was Hon. Charles Marcil. He put a question to Dr. Steele as follows:—

"Does the hon. member intend to ask that any of the powers now held by the provinces in this matter should remain with the provinces or that they should be brought under the control of the Dominion by an amendment to the British North American Act?"

Dr. Steele replied in the following manner:—

"There should be no interference whatever with the work now being carried on by the provinces; but there are other lines in which, with a Federal Health service, the health work of the nation could be co-ordinated in such a way that there would be no overlapping; there would be much greater economy of service and much greater efficiency

"There are, of course, many matters which the provinces have not power to deal with, as the British North America Act places the great bulk of health work under the jurisdiction of the Federal Government."

If the provincial health departments were to put into force one-half the power already vested in them, it would be safe to say that at least half of the 50,000 lives now lost every year would be saved. But they do not, hence one strong reason why a Federal department of health is absolutely necessary, and we should not even be too severe with the provincial health departments, because of the fact that municipalities are trying to usurp the power vested in these provincial health departments. We believe that rather than interfere with the provincial powers, a Federal department should be formed to strengthen them and to see that the powers vested in the provinces be enforced.

Just as Dr. Steele's reply to the Hon. Charles Marcil would infer: *"There should be no interference whatever with the work being carried on by the provinces."*

By no means should work that *is being carried on* be interfered with. But rather their power should be supplemented.

In conclusion, then, let it be said, that we should do all in our power to assist, both the municipal and provincial authorities in the carrying out of our health laws. Not in the letter particularly, but rather in the spirit.

We should also do all in our power to help along the work of establishing a Federal Department of Health. Our whole work is of national importance, and should be under a national department.

An Address on Bookkeeping

Given Before the Toronto Society of Sanitary and Heating Engineers—Some Splendid Examples, Simple Yet Necessary, to the Success of all Businesses.

By D. MacLulich, accountant, Keiths, Limited, Toronto.

I have now completed the description of the various books enumerated at the commencement of this address with the exception of the ledger, and as the form of the ledger is undoubtedly known to you all, I will not tax your patience unnecessarily by a description.

You will remember I spoke about making the ledgers or various sections of the ledger self-balancing. What I meant to intimate was that the form of books I have given you here will allow of the compiling an account in the private ledger designated "Sales Ledger Controlling Account," and another called "Purchase Ledger Controlling Account." To these two accounts are posted the monthly totals of all the entries recorded in detail in their respective ledgers; and the balance shown on say the "Sales Ledger Controlling Account," at the end of any month equals the total of all the outstanding accounts in the sales ledger and proves the correctness of all the entries therein. The "Purchase Ledger Controlling Account" checks the purchase ledger entries in the same manner. As both accounts can be written up in the short space of five minutes each month they are well worth incorporating in your books, but as I said before they are not essential but optional.

The following are illustrations of both these accounts:—

The yearly closing entries on these books would be very simply and easily

executed and perhaps at some time if it is desired they could be explained, but to do so now would make this paper too lengthy.

Guard Your Credit Standing

Gentlemen, a most important feature in our business is what is termed our credit standing. If it is good it enables us to buy better than a competitor not so happily situated; it often carries us around a temporary tight corner and further it encircles all our business dealings with a genial atmosphere. If I were asked to state what I meant by the term "credit standing," I would say in its broadest sense the credit standing of a man or firm was the business world estimate of his financial and moral worth. Many a man whose financial standing is somewhat weak has yet an excellent credit standing because of his moral worth, by which I mean that it is known that his word is as good as his bond, and that he will enter into no obligations rashly which he cannot see his way clear to fulfill.

Now I say most emphatically that no man can have a good credit standing who does not employ in his business a good system of accounting; first, because his financial standing can never be accurately gauged, and, secondly, because of the fact that he is conducting his business operations so loosely, a question mark is necessarily appended to his moral worth. A further feature, in this connection, is, that with a good system of accounts a man will necessarily and almost unconsciously make better collections from those persons owing him money and thus will be in better shape to in turn pay off his own obligations more promptly, so enhancing his credit.

Watch Your Overhead Expenditure

Another most important subject to our trade is that of overhead expense. I am quite aware that to a great many persons it is not a popular subject and the man who broaches it is looked upon as a nuisance. We are all aware in some dim, hazy way that it exists and that strictly speaking we should give it some kind of special treatment in accounts, but we have an idea that it is an intricate subject involving a considerable amount of detail figuring and as we have managed to get along fairly well in the past by ignoring it, we decide to continue along the same lines in the future.

I hope to convince you to-night that there is no feature of our business that will yield us larger and quicker returns in dollars and cents than a proper recognition of overhead expense in our system of accounts, and I have no hesitation in emphatically stating that if there is one reason more than any other why our trade in Toronto is not more prosperous, it is this failure to recognise the relation of overhead expense to the price at which we sell our work to the public. Why is it that so many barely make a living out of their business while many more do not even succeed in making as decent a living as the journeymen they employ. How many of our trade here in this city have accumulated sufficient profits year by year to enable them to retire and live comfortably in their old age?

Sanitary Engineers Not a Wealthy Class

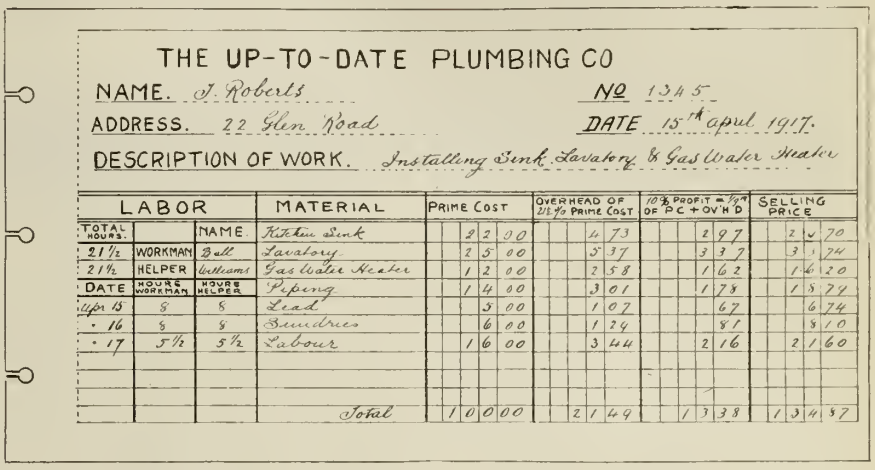
In 1913, Boyd's Dispatch, a United States Financial Record listed 38,978 master plumbers, of which only 12½ per cent. were credited as being worth $5,000 or more, while 87½ per cent. were not worth as much as $5,000. So that after, in many cases, a lifetime devoted to the business, they closed their career by death or otherwise, often not only being worth less than $5,000, but going out owing their source of supplies and leaving their family dependent on others.

Some, so-called business men, I am aware, claim they have no overhead expense, or that it is so trivial that it is abundantly taken care of in the percentage of profit they add to their prime cost. Now, I am going to enumerate just a few of the items of overhead expense that any man conducting any size of plumbing business, however small, is bound to have, and I will say this, that you will never know what your overhead really is until you install a proper system of bookkeeping in connection with your business. It has been proved, however, by taking a large number of actual examples that a business doing a yearly turnover of, say, $15,000 to $18,000, has an overhead expense of at least $2,500, and more probably $3,000.

I hope you will get this firmly fixed in your minds that overhead expense is indissolubly connected with your business; if your overhead expense is nil, then your business is nil, and it is just as much an item of cost as the material you purchase for re-sale, or the labor you pay for, only as it is impossible to divide it up into units and charge certain units of it to the cost of each particular job you do, it is necessary to devise a way of distributing it over all the jobs you do and the percentage method of distribution is the most workable, but because to some minds not practiced in the handling of figures, this seems to lend a certain amount of indefiniteness or scope for choice, the whole question of overhead expense is incircled by indecision and mistiness.

What Are O. H. Expenses?

The following are a few items of overhead expenses:—



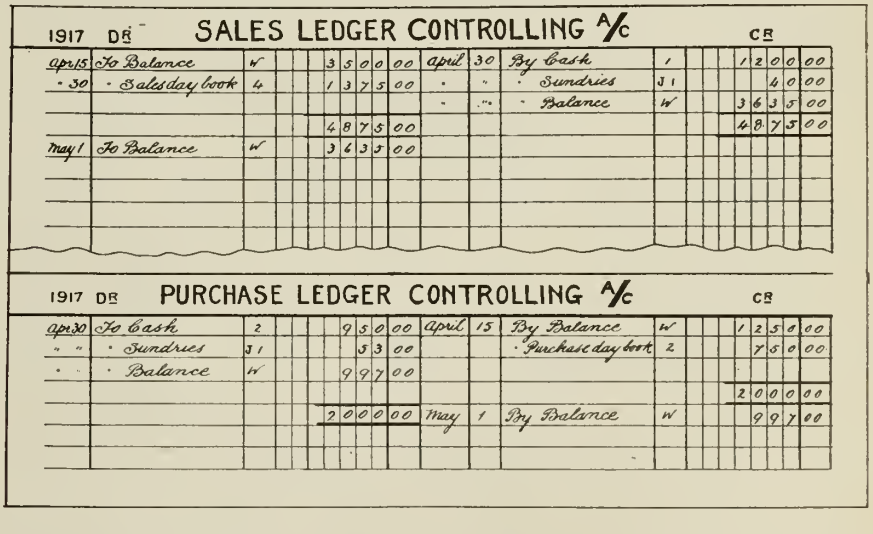
THE UP-TO-DATE PLUMBING CO

NAME. J. Roberts — No 1345

ADDRESS. 22 Glen Road — DATE 15th April 1917.

DESCRIPTION OF WORK. Installing Sink Lavatory & Gas Water Heater

LABOR			MATERIAL	PRIME COST	OVERHEAD OF 21½% PRIME COST	10% PROFIT = ⅓ OF P.C. + OV'H'D	SELLING PRICE
TOTAL HOURS.		NAME	Kitchen Sink	22 00	4 73	2 97	29 70
21½	WORKMAN	Bell	Lavatory	25 00	5 37	3 37	33 74
21½	HELPER	Williams	Gas Water Heater	12 00	2 58	1 62	16 20
DATE	HOURS WORKMAN	HOURS HELPER	Piping	14 00	3 01	1 78	18 79
April 15	8	8	Lead	5 00	1 07	67	6 74
" 16	8	8	Sundries	6 00	1 29	81	8 10
" 17	5½	5½	Labour	16 00	3 44	2 16	21 60
			Total	100 00	21 49	13 38	134 97



1917 DR SALES LEDGER CONTROLLING A/c CR

April 15	To Balance	W	3	5	0	0	00	April 30	By Cash	1	1	2	0	0	00
" 30	" Sales day book	4	1	3	7	5	00	"	" Sundries	J1			4	0	00
								"	" Balance	W	3	6	3	5	00
			4	8	7	5	00				4	8	7	5	00
May 1	To Balance	W	3	6	3	5	00								

1917 DR PURCHASE LEDGER CONTROLLING A/c CR

April 30	To Cash	2		9	5	0	00	April 15	By Balance	W	1	2	5	0	00
" "	" Sundries	J1			5	3	00		" Purchase day book	2		7	5	0	00
" "	" Balance	W		9	9	7	00								
											2	0	0	0	00
			2	0	0	0	00	May 1	By Balance	W		9	9	7	00

Rent.—We all pay rent in some form; if you own the place yourself, then by using it for your business you lose that amount that you could obtain from some one else by renting it out.

Salaries.—Even if you employ no office help, and claim you draw no salary, yet, in fact, you live off your business the same as all of us, and however you

seek to cloak it, you, in fact, do draw a salary, and it will be much better for your business and consequently yourself if you will recognize it and draw a certain stated amount per week or month as salary; such amount should not be less, anyway, than you pay your journeymen.

Bad Debts.—You are a much to be envied personage if you never draw one of these surprise packets out of the business lottery.

Tools.—Loss and wear on tools—this does occur and must be given expression on your books.

Insurance.—You may not carry fire insurance, but you cannot get away from carrying the risk. Also you must pay your dues to the Workmen's Compensation Board.

Car Fares, Postage, Telephone.—You would be surprised how these total up during the course of a year.

Discounts and Allowances to Customers.—Now and again we all come across an obstreperous customer to whom we have to most unfairly make an allowance to obtain settlement of our account.

I do not want to weary you, and so I will not go on to enumerate the other kinds of overhead expense.

Assuming that we are doing a yearly turnover of $18,000, and our overhead expense averages $3,000, then our overhead expense is 16 2/3 per cent. of our turnover, or, and I wish you to note this particularly, our Selling Price and each sale we make should bear its proportion of the expense or cost of doing business. Assuming that we require 10 per cent. net profit the following illustration may make clear how we put into practice this method of charging.

Prime Cost.—Labor and material = 73 1/3 of selling price. Overhead = 16 2/3 of selling price. Profit = 10 per cent. of selling price.

We will say, for example, that the prime cost in this instance is $100. Then 73 1/3 of S.P. = $100; 16 2/3 per cent. of S.P. = $22.66; and 10 per cent. of S.P. = $13.60.

Our selling price will then be:—

Prime Cost, 73 1/3 per cent. =	$100.00
Overhead, 16 2/3 per cent. =	22.66
Profit, 10 per cent. =	13.60
Selling Price, 100 per cent. =	$136.26

Many men think they are doing splendidly by adding, say, 33 1/2 per cent. on the cost of their labor and material and figure in a general way that they are carrying their overhead and getting a good margin of profit, but from the above illustration you will see they would not be earning even 10 per cent. net profit; while there are even many businesses that put on even less than 33 1/3 per cent.

While I have given you this illustration, I am sure you will find it much easier in actual practice to arrive at the correct selling price if you calculate overhead as a percentage, not turnover or selling price, but of cost, i.e., cost of labor and material.

Using the same instance of a business with an overhead of $3,000, and a turnover of $18,000, the prime cost would, I should judge, be approximately $14,000, and the overhead expense would, therefore, be 21.43 per cent., or, say, approximately 21½ per cent.

The following will illustrate this method:—

	Prime Cost	Overhead 21½% of P.C.	10% Profit 1 9 of P.C. plus Overhead	Selling Price
Kitchen Sink	$22.00	$4.73	$2.97	$29.70
Lavatory	25.00	5.37	3.37	33.74
Gas heater	12.00	2.58	1.62	16.20
Piping	14.00	3.01	1,78	18.79
Lead	5.00	1.07	.67	6.74
Sundries	6.00	1,29	.81	8.10
Labor	16.00	3.44	2.16	21.60
	$100.00	$21.49	$21.49	$134.87

I would suggest that you have a form printed which I will style a "Jobbing Form." It should be printed in duplicate and immediately you take an order for jobbing work, you enter on the top of this form who the work is to be done for and a general description of the work to be done. Hand one copy to the journeyman who is to do the work and keep the other copy in the office. The workman should enter on his form all the material used and the number of hours the job takes and when completed turn it into the office. The office copy of this form could be ruled in columns showing the prime cost, overhead, profit and selling price as illustrated above, and if this was done faithfully, I think the trade in Toronto would save many thousands of dollars a year.

There are many other ways of distributing overhead expenses all in their way good and suitable to different classes of businesses.

Where a plumbing and heating house is doing a large contracting business, I, myself, personally, favor the distributing of overhead as a percentage of productive labor, as nearly all the items that go to make up overhead expense are largely in themselves, so to speak, the offspring of time, such as rent, administrative salaries, taxes, insurance, etc.

In connection with plumbing and heating accounting for a business that is largely contracting it is a big money saver to install a good system of cost accounting. By the term, good, I mean one that is absolutely accurate and at the same time that is not too cumbersome and that can be operated at little, if, any, additional expense. This, however, is a complete story in itself, and is not, I take it, of general interest, so you will not be sorry if I do not touch upon it to-night. I will only throw out one brief remark as food for thought to any who are interested and that is that in distributing overhead on a percentage basis, we must not lose sight of the relation it bears to turnover and in our final results must show not only the profit or loss on the individual contracts we have handled, but also the profit or loss as the case may be, due to increase or decrease of turnover.

Gentlemen, this address has been more in the nature of a lengthy address on Elementary Bookkeeping, and if, in seeking to gauge the necessities of the association as a whole, I have, so to speak, shot wide of the mark, I can only express my deep regret and crave your indulgence for my error in judgment. Furthermore, it was impossible to treat the subject exhaustively in one evening. I have, therefore, had to content myself in giving you a skeleton outline, but one which you can build on and find workable.

EXPORTS PROHIBITED

The British Trade Commissioner in Canada has received a cable from the British Board of Trade, London, stating that exports from the United Kingdom of the following goods are prohibited. as from May 1:—Mineral waters, beer, ale, candles, paraffin wax, iron and steel constructional material, tubes, sheets, etc.; plywood, railway material, resinous substances. Licenses are obtainable for goods in transit through the United Kingdom, now affected by import and export prohibitions, except in neutral ships.

BULK SALES ACT DELAYED THROUGH CARELESSNESS

As matters at present stand the Bulk Sales Act does not become effective until October, 1918. The reason that this much desired Bill is placed thus far into the background, is the result of carelessness.

It appears that the Bill as originally presented called for it to become operative in October, 1917. Through some clerical blunder however the date appeared on the finished Bill as January, 1918. This mistake was of course noted when the Bill was read over and it was explained that the correct date should be October, 1917. The name of the month was changed, but the change went no further, so the Act as it has finally been passed sets the date of operation at a year from the coming October.

Efforts are being made to get the date changed while in the hands of the law clerk. It is very doubtful however if any such action will be permitted. If it fails the only recourse is the one proposed by V. A. Sinclair of Tillsonburg, the proposer of the Bill, an amendment to the Bill advancing the date of its operation.



A plant of the nature here described and illustrated embodies in its make-up and result accomplishment features of interest alike for the sanitary engineer and private citizen, no matter their community or national location; the necessity for pure water, either for consumption alone or as a food constituent being generally recognized as a public health essential.

By A. G. Webster.

ARTICLE 3.

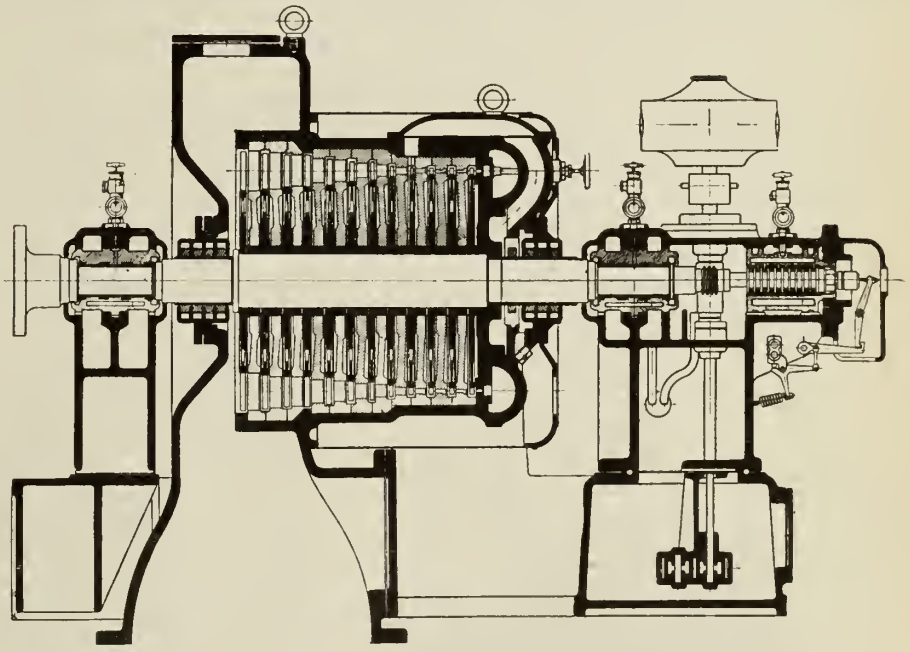
Auxiliary Pumping Units

IN the pumping station under the switch board gallery are located various auxiliary pumping units, while there is also a De Laval booster pump situated near the main pumps. This booster pump has a capacity of two million Imperial gallons per 24 hours, and is intended to be used when only a comparatively small volume of water is required for the filters or other purposes. It delivers into the raw water main and against the same head, viz., 32 feet, as the 36 in. pumps. It is also of the same general design as the large pumps, and is direct connected to a 20 horse-power Canadian Westinghouse alternating currents.

The equipment under the switchboard gallery consists of two wash-water pumping units, two hydraulic pumping units and two drainage pumps, the extra set in each case being a reserve unit. Each wash-water unit pumps water up to the wash-water tank for back washing the filters, and consists of a 5-in. De Laval centrifugal pump having a capacity of 350 Imperial gallons per minute against a head of 180 feet. It is direct connected to a 20 horse-power Canadian Westinghouse a.c. motor running at 1,415 r.p.m. There are two of these units, each pump being equipped with a by-pass so that water can be obtained from various sources of supply.

The hydraulic pumps operate in connection with an accumulator and supply a pressure of 700 lbs. per square inch for operating the hydraulic gear on the various gate valves in the plant. These pumps are of Glenfield & Kennedy vertical triplex type, driven through worm gearing by a Lancashire meter.

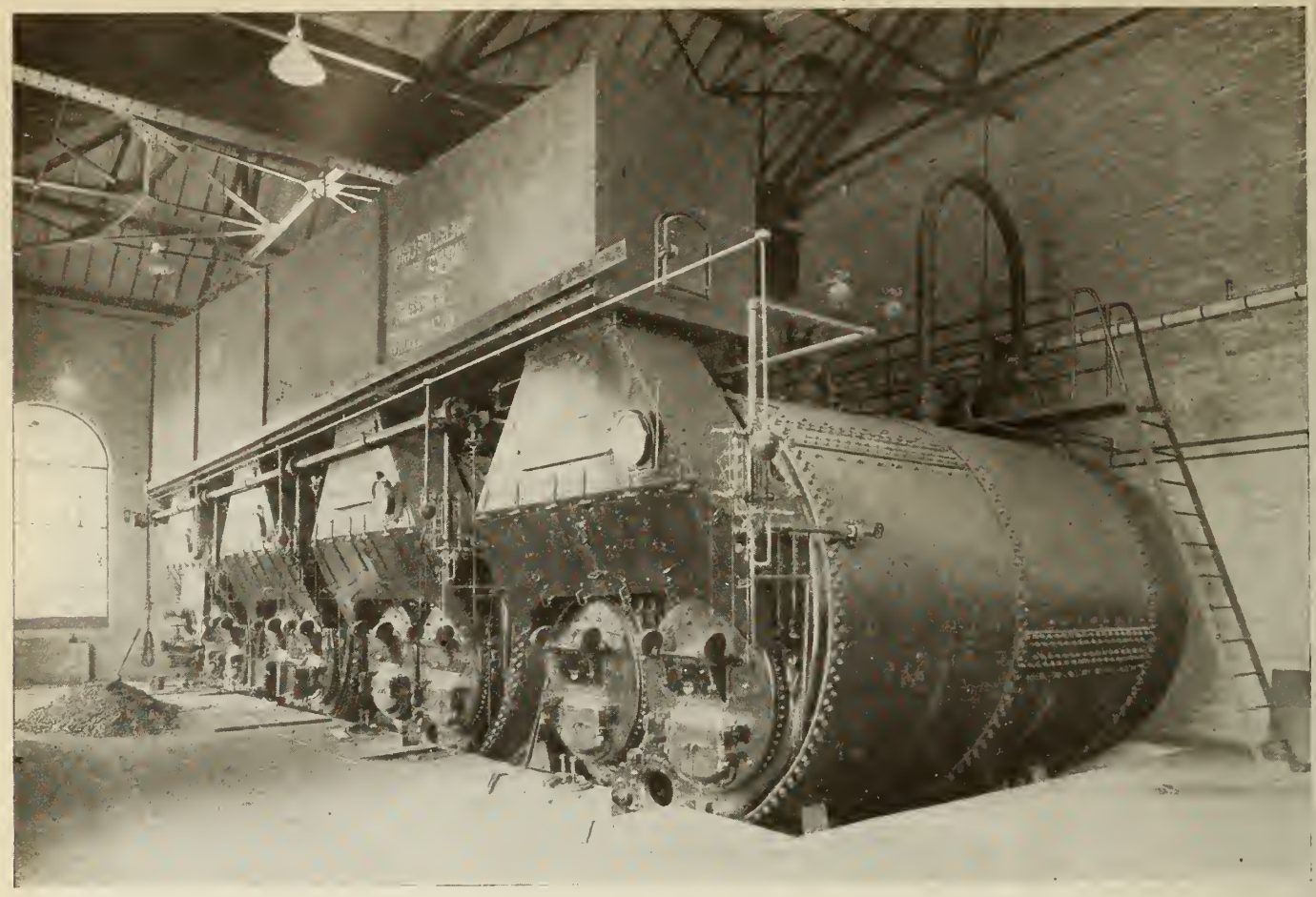
On each panel there are the usual operating handles for the oil switches and a pair of relays, the general layout being arranged to use hydro current or the power generated at the plant. On the wall behind the switchboard are mounted the remote controlled oil switches, also the starting and running buses on the 2,200 and 550 volt motors. The transformers are of Canadian Westinghouse make, and consist of three 50 k.w. units transforming the line current at 2,200 volts down to 550 volts for the small motors, and two 25 k.w. transformers for the lighting system which is 3-wire, 220,110 volts. All motor connections are made in lead-covered triple conductor cable.



Axial section, showing general arrangement of "De Laval" 1800 horsepower, impulse type, multi-stage steam turbines.

Steam Heating System

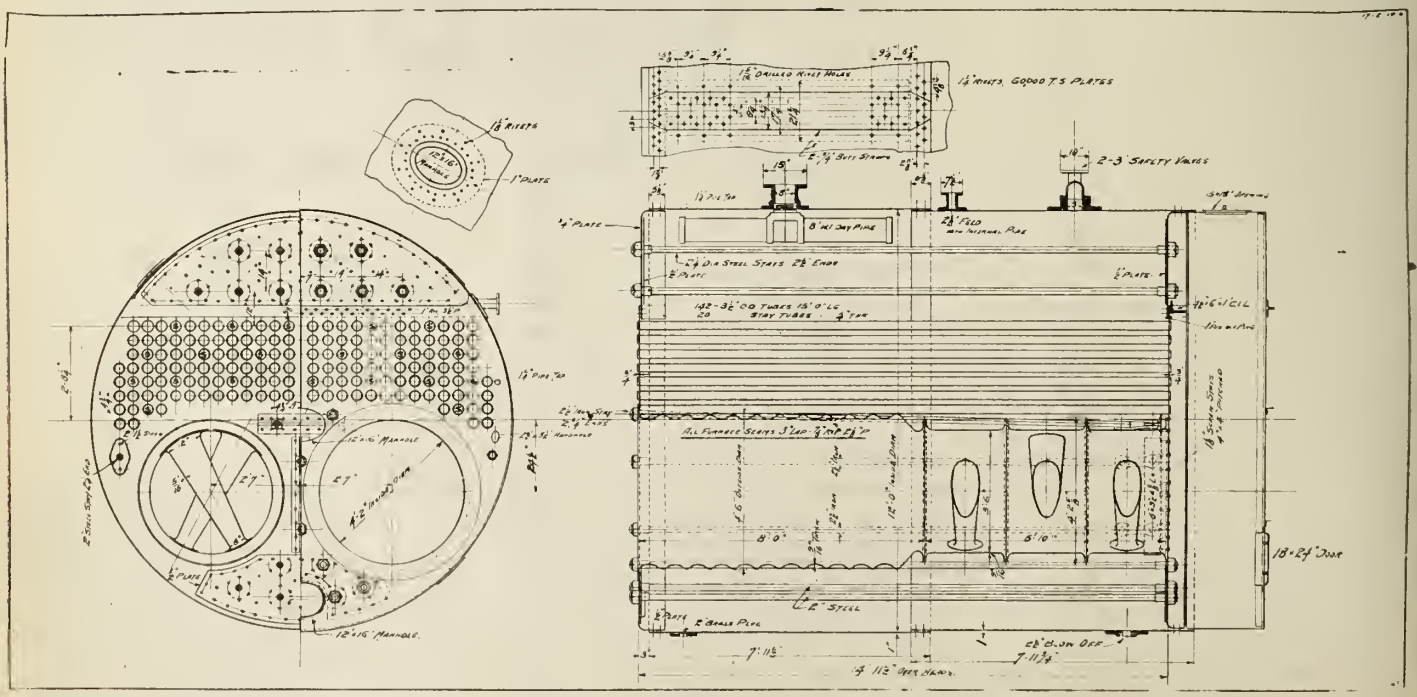
The steam heating system was designed and installed by Bennett & Wright, Toronto. It is of the low pressure vacuum type, steam being obtained from a valve on the boiler header and passed through two extra heavy Kiely & Mueller reducing valves. The first valve reduces the pressure to 80 lbs. and the second to 10 lbs. There is a connection between these two valves to the heating system in the wash water tank. The layout of the system generally does not



Boiler room showing battery of four Marine type, two-furnace dry back boilers.

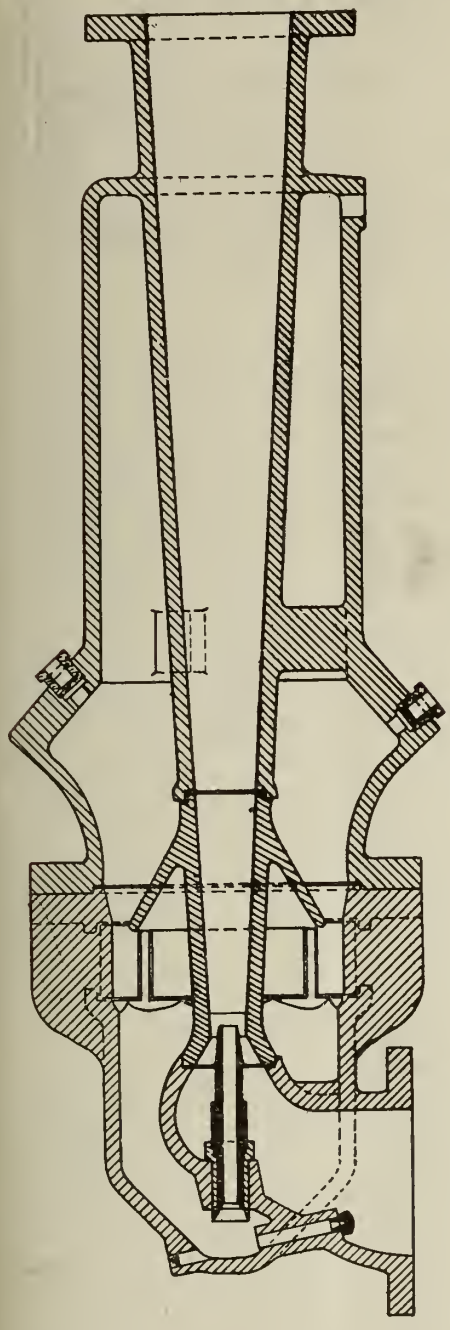
present any unusual features except in the filter house where the steel tanks and large surface area of contained water had to be taken into consideration. Attention had, however, to be given to the matter of the wind pressure on the filter house tending to drive the heat to the opposite side of the building causing inequality of temperature. The total amount of radiation is 17,940 sq. ft., made up principally as follows:—Filter house, 15,144 sq. ft.; pumping station, 1,764 sq. ft.; suction well building, 612 sq. ft.; chemical house, 324 sq. ft.

In the filter house the temperature has to be maintained at 50 degrees Fahr. At the ground floor level, radiators are suspended under the windows on the walls by special steel hangers. The radiators are arranged in two 12 ft. sections one, above the other. Radiators are also suspended on the operating gallery and on the skylight. The heating of the entire building can be con-



Detail of marine type, dry back boilers, showing "Morrison" corrugated furnaces; working pressure 150 lbs. per sq. inch.

trolled from a point midway on the operating gallery. At this point is a header with eight connections to various sections of the building, each connection being controlled at the header. The main steam line to header and the header itself are both 9 in. in diameter. The header controls are as follows:—One for the window low level radiators, west

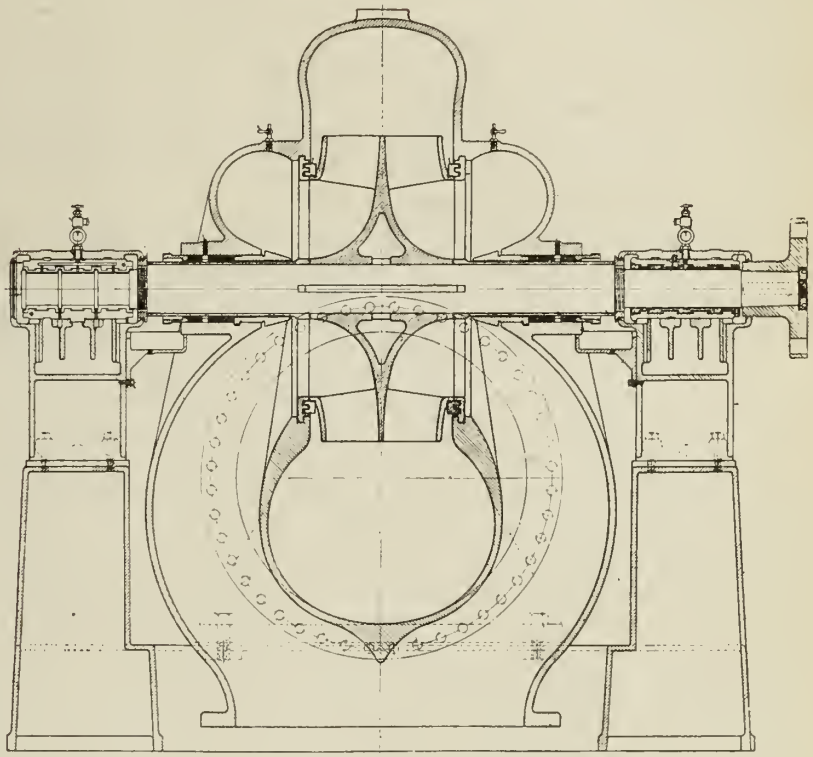


Detail of sand washer.

side; one for those on the east side; one for the gallery radiators, south section; one for the north; two for the coils on the west and east sides respectively; two for the skylight or monitor radiation, east and west; the centre connection being the steam supply. The control system was adopted in order to equalize temperature when the wind pressure, already referred to, drives the heat from one side of the building, making the other side too warm, in which case radiators on the warm side would be cut off. The filter house has 15,144 sq. ft. of radiation.

The pumping station has 1,764 sq. ft. of radiation, and all the radiators in the building have hand valves, and also a "vento" vacuum trap on the return line. These traps allow air and water to pass through, but hold steam in the radiator. The chemical house has 324 sq. ft. of radiation and the suction well building 612 sq. ft. The installation in these two buildings is precisely the same as in the pumping station. These three buildings have to be maintained at 70 degrees F. in zero weather.

The wash water tank is heated by steam at 80 lbs. pressure taken from a point between the reducing valves on the boiler. This line is connected to a 2-in. pipe around the tank inside, the



Section through "De Laval" 36 ins. centrifugal pump.

steam mixing with the water. A Bawden 40,000 sq. ft. 8-10-10 in. vacuum pump is installed in the boiler house for drawing the returns from the system under from 10 in. to 15 in. of vacuum to the "Cochrane" heater also in the boiler house. The pump is controlled by a Foster vacuum governor. All main steam lines are covered with air cell covering and the radiators are painted with two coats of old bronze. The radiators were supplied by the Dominion Radiator Co.

Lighting System

The lighting is on the 3-wire 110-220 volts, single phase, distribution system, and was installed by E. F. W. Salisbury, Ltd., Toronto. The distributing mains are run underground from the switchboard to the various buildings, the circuits being run to Crouse-Hinds panel boards enclosed in steel cabinets. The wires are carried in galvanized conduits supplied by Conduits, Ltd., Toronto. The lighting in the chemical house consists of two 40-watt lamps on each landing, also four 100 and one 25-watt lamps, with reflectors in the chemical storage. In the coal storage are ten 60-watt lamps. In the suction well building is a cluster light containing five 100-watt lamps. In the pumping station there are ten wall brackets, each with a 200-watt nitrogen filled lamp and angle reflector. There are also six suspended semi-direct lights, each having a nitrogen filled lamp, and sixteen 60-watt lamps in various parts of the building. In the boiler room there are twelve 60-watt lamps and one 100-watt lamp with reflector. There are six 60-watt lamps installed in front of the boilers, near the water gauges. In the filter house there is one cluster light containing five 100-watt lamps over the centre of each tank, equipped with special reflectors. There is also a lamp at each operating table, making a total of 15 lights, ten of 500-watt capacity and five of 300-watt capacity. There are also a number of lights around the bottom of the tanks and on the stairways. The wharf is illuminated by means of nine 300-watt lamps mounted on brackets.

In conclusion, it should be mentioned that both buildings and equipment represent workmanship of high order. The plant is unusually interesting from an engineering standpoint, as it is the first one of its kind to be installed in this country.

THE SANITARY ENGINEER

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JUNE 1, 1917

FEDERAL DEPARTMENT OF HEALTH

AGAIN the question of a Federal Department of Health is under consideration at Ottawa. Dr. Michael Steele, Member for South Perth, is sponsor of the bill, and a number of other members of the House of Commons are in favor of it.

With a view of giving the readers of THE SANITARY ENGINEER a fair idea of some of the arguments in favor of the bill, we are publishing certain abstracts from it on another page.

We wish, however, to point out to our readers that though Dr. Steele is a medical man, he gives sanitation the very first mention, then he treats the question from the medical viewpoint. For instance, in his speech he said, "prior to the outbreak of war there was much evidence of the progress of sanitary science, etc." He then goes on to quote a number of statistics regarding the stamping out of cholera, typhus, etc., which was, no doubt, the result of mechanical and medical progress, rather than the result of any part which medical science has played.

But, be that as it may, it is the duty of every human being to give ear to any proposal that will make this world a better place to live in, and that first duty is a call to sanitary, heating and ventilation engineers. We stand, as do our works, for cleanliness and comfort, we cannot have comfort if our homes and all our other environments are insanitary. The sanitary and heating engineer who is in the profession for merely personal gain may just as well get out of it at once. He belongs to that class of "plumbers" of the old days who felt that the lead pipe, and wiped joint were his only mainstay. Sanitary and heating engineering requires men of vision, men who will assert themselves by their good works, men who love their calling and who desire to serve their fellowmen are and will be counted as successful men in the days to come.

In life, all those that live upon a weaker class are looked upon as parasites, the big corporations, the autocrat, the man or men who store up gains are being looked upon by the masses as unworthy, not as successful men. The present war is having a cleansing, purging effect upon the world, which could not have been foreseen. We are being bound closer together by ties that will bear all strain, and it is those who make themselves, and their labors of greatest worth to the most people that will in future days be counted as successful men.

And if the sanitary and heating engineers are to be a successful body of men and their profession worthy, they must come into the limelight, they must join in this movement for the establishment of a Federal Department of Health, so that more uniformity of work, and of purpose will be accomplished. We will be glad to receive the opinions of any of our readers in this matter and hope to be heard at no distant date, pleading with the powers at Ottawa, to establish this new proposed Federal Department of Health.

WATCH THE BUYING END

WE question very much if there ever was a period since the war broke out when the prices of material were in such a chaotic condition. Manufacturers are taxed more than ever in watching the market and sources of supply. Transportation is anything but satisfactory and all along the line conditions that have any bearing upon industrial supplies are not to be depended upon. Not only should prices be watched, but also the conditions of transportation. This does not by any means follow that there need be any alarm felt, but rather that members of the craft should watch prices, etc.

If the trade realize the importance of the need for watching the buying end, these difficulties being surmounted in a business-like way, the efforts will prove beneficial on the whole. Such conditions may be the means of making better business men of our craftsmen, and in that way prove of inestimable value to one and all.

Straight Talks to the Craft

Being the Third Article Dealing With the Proceedings of the Last Four National Conventions, Provincial as Well as Local Convention Proceedings Will Also be Commented Upon.

By One of Us.

EDITOR SANITARY ENGINEER: In reading your interesting article "Straight Talk to the Trade" one immediately appreciates the sincerity of purpose which prompted you to take the initiative in an endeavour to bring about a more constructive policy of organization among sanitary and heating engineers in the Dominion of Canada.

Being a reader of the craft journal "SANITARY ENGINEER" and not having noticed any attempt on the part of any of your readers to co-operate with you in your endeavours permit me to offer a few remarks offered with the best of intentions to all concerned.

In summarizing the remaks of Mr. J. Thibault one can easily understand that the calling of the sanitary engineer is one of the most vital amongst all the callings of man. Its close association with the health of the human being renders it of great importance in the conservation of life. Such a claim is quite apparent to the average layman and therefore doubly so to the sanitary engineer and requires no comment.

In a further remark Mr. J. Thibault states that the people of this dominion expect each person to do the right thing by taking to themselves only what is justly their own and leaving for others what is theirs. He further requested that care be taken with the class of men one employs and to be jealous over the observing of all bye-laws or regulations dealing with sanitary matters.

Morally these statements are idealistic and I am prompted to examine how such sentiments work out in the city wherein I live and work, Montreal.

Here the sanitary trade has been fortunate enough to have by-laws passed demanding that all persons following the calling of sanitary engineer either as journeyman or master must be licensed and registered, such license being obtained only after passing an examination on sanitary matters. Now I ask the question what have the master plumbers of the city of Montreal done in an endeavour to endorse such by-laws? As far as my experience carries me I can safely answer, nothing. On the other hand, in this city cheap and incompetent labor can be found in all its glory! ! ! save the mark. Here the botcher is rampant and any person who thinks that he is a plumber can find work irrespective of his experience providing he will work cheap. I maintain that the masters being the body with the greater power are more or less to blame for such a state of affairs. For years this city, a city of more than half a million people, had a plumbing department the greater percentage of which were not competent and never had experience in the sanitary business until the time that they were inspectors of plumbing, and I add that what little improvement had come about has been solely the work of the journeymen plumbers association. After some considerable effort this body succeeded in having five practical men placed on the inspection staff and a motion passed in the council chambers that in future none but practical men shall be appointed as inspectors.

Even at the present time there is, in the state of deepest embryo, a new proposed by-law on sanitary matters. The plumbers' association, have spent time and money in an endeavour to have this made law but in spite of all work there is no progress and the proposed law seems to be amongst those laws that come only to be out of date and fit only for museum record. Here I ask another question, what are the master plumbers doing to hurry this by-law through the council chambers. I again answer, nothing. Such a law would interfere with them when they wished to employ their beloved botcher. They would be giving to others what was justly theirs and making less profits. A state of affairs that they do not like.

To Mr. J. Thibault's remarks regarding the wholesale houses I would add that there should be a minimium rate of pay for the mechanic and if such were recognized each master would start from the same basis when figuring on a piece of work; the price of labor being even to all.

I beg to differ with Mr. J. Thibault when he states that the sanitary condition of the homes of the people have improved from fifty to sixty per cent. bad. to some figures definitely better. My experience leads me to say that not five per cent. of the homes used by the workers would pass a strict sanitary test. The work is done on the cheapest scale possible and of course the cheapest mechanic is used to supply the labor.

It is deplorable that up to this not one master has offered suggestion to remedy this state of affairs for I have no doubt that a few of them know the low state that sanitation is in, here, in Montreal.

In your article, May 1, you ask if there is not one live member who will c
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EDITOR'S NOTE

The accompanying letter is the first reply to the series at present appearing in the S. E.

It is from a journeyman who hopes at some future date to be an employer He will, if he upholds his own personal convictions, make a better employer than many we know of. He will pay fair wages and demand fair prices. Such conduct will be very desirable.

We presume that he will employ none but practical men and expect to pay living wages. Toronto is already feeling the benefit of having come to such an agreement as has brought about good-fellowship between the employer and employed.

We hope to see the day when every member of organized labor, in the plumbing and heating trade, will be required to pass an examination before he can become a member, and that employers will demand that the men they employ hold some form of certificate, showing their practical knowledge. In many towns the journeymen have to pass an examination before they can work at the trade, the test being made by the civic plumbing inspection department.

The SANITARY ENGINEER *begs to point out that if all plumbing were compelled by law to be inspected annually, and no repairs done unless the party doing the work filed a declaration of having completed it, then 99 per cent. of the men engaged by employers, to whom our correspondent refers, would be eliminated.*

We would like to hear from more of our readers, and we hope to see "something attempted , something done." No doubt both journeymen and employers have much to accomplish, if things are to be improved. Criticism will do much to overcome a lot of the evils now existing.

If, as our correspondent says, the new by-law has not yet been put into force in Montreal, there is a screw loose somewhere. Some person or persons are "resting their oars." The trade is too lenient in such matters, and should "waken up." The writer knows full well that a number of employers in Montreal put in a lot of their good, valuable time in re-modelling a by-law, and it seems too bad to have the results of their labor shelved as they appear to have been.—Editor.

Regarding the Installation of Pneumatic Water Systems

Many Readers Are Being Confronted With Problems Relating to the Proper Installation of Pneumatic Water Systems

By "Troubles Man."

BOTH the problems are very simple ones, but have actually been brought to our attention, and while they could be answered in a few words, it was deemed best to explain a few more points about the accessories in connection with the proper installation, as well as some of the troubles confronted owing to electric switches, and losing of air.

Problem I.

In Fig. 1 is shown a tank with a pipe leading from the top of a pneumatic tank, **which is not proper**, and is in direct opposition to the principles of pneumatic water system practice.

The manufacturing of these tanks is a science in itself and our readers must not think for one moment that all tanks which are of the same shape, and apparently constructed in the same manner, are fit for pneumatic water systems. Neither should a tank built for this purpose be thrown around in the same manner as a tank built for ordinary purposes.

To prove these statements it would not be out of place to follow the course of operation in the manufacture of a riveted pneumatic tank. The plates are first carefully sized, marked for rivet holes and turned; that is, rolled to cylinder shape. There must be no straining to bring the laps together, and the rivet holes must be of a perfect fit. Caulking is a very exacting operation, as are, finally, the tests.

An ordinary steam boiler may be just as carefully constructed, but need not be as tight, and is not subjected to an air test at all. Often one of these steam boilers will sweat and leak slightly at the joints under a 200 lbs. water pressure test, and be passed as very satisfactory. But not so with a pneumatic tank, the 200 lbs. water test is often put on and found perfectly tight, but when the same tank is subjected to a 125 lbs. air test, it leaks very badly, and caulking the joints and rivets has to be done over again. All the joints and rivets are swabbed over with soap lather, and any leaking of air will make a bubble; that part is again caulked, and so on until the tank is perfectly tight under at least a 125 lbs. air pressure.

It will be seen, therefore, in the first place, that all such tanks should receive very careful handling; next, that no connection other than that necessary for the top part of the water glass mounting should be made. The tapping of this hole is always slightly small, so that the brass mounting will be a tight fit.

It may be argued that if one opening n be made, why not two? Our answer hat there may not be any very great tion to two openings if they con-

If any reader has experienced any trouble in connection with pneumatic water systems, we will be pleased to hear about such trouble and will treat it fully in this series of articles in the order received, unless the reader requires a prompt answer.—EDITOR.

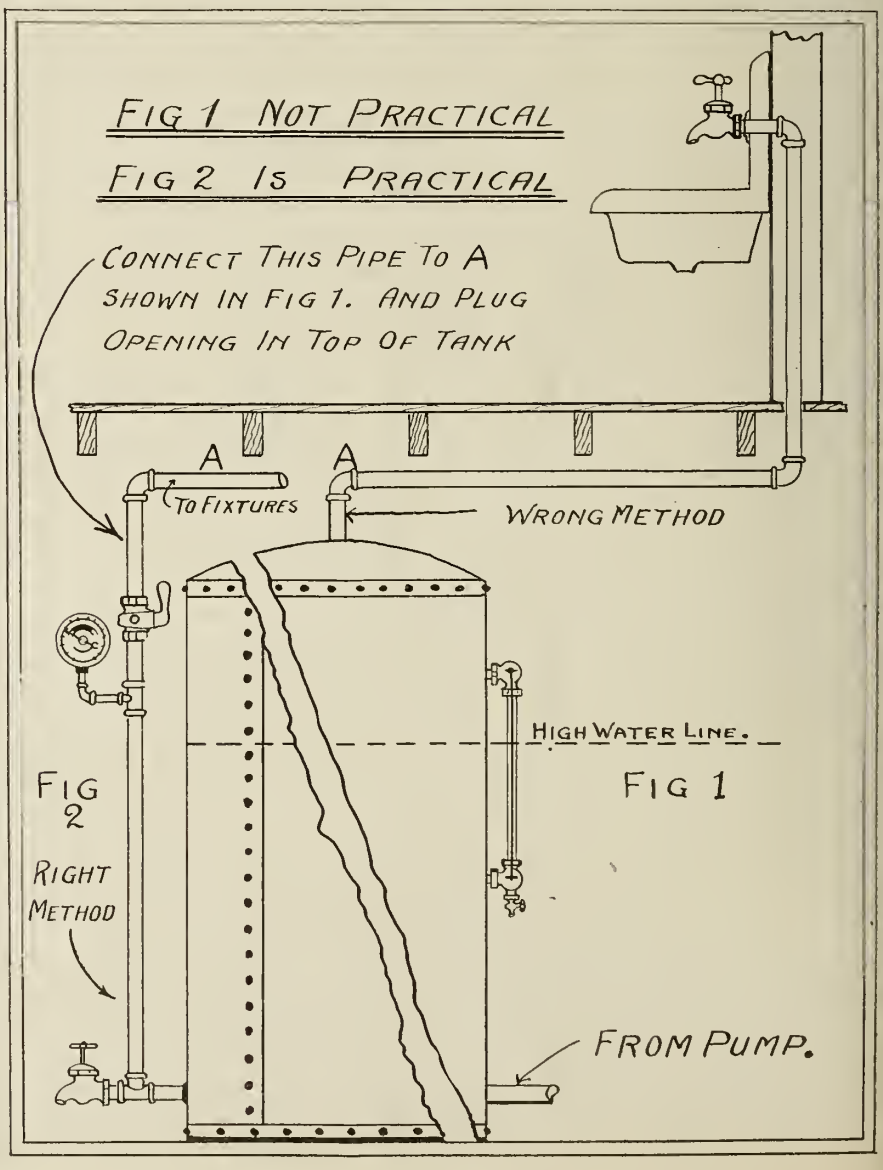
stitute only two joints. But if a pipe line is taken off for any purpose whatever, there is sure to be more than two joints. In the problem under consideration, however, the pipe line was used to get water from the tank, and therefore the air which really is all that constitutes that part of a pneumatic system is lost, because the compressed air is really the power which drives the confined water to any point required, and once the air is drawn off, which was the case in this problem, there remained no air power to deliver the water.

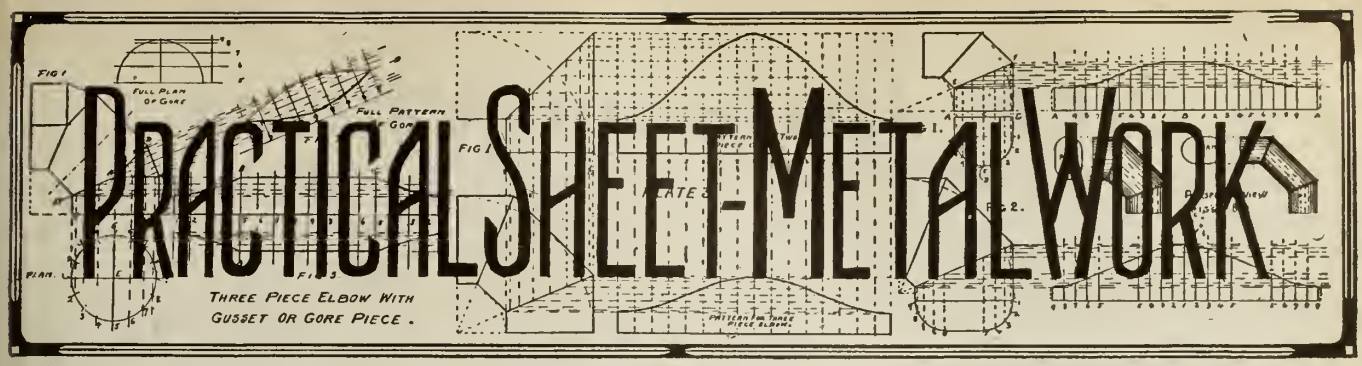
The question has been raised as to the capacity of the one opening at the bottom of the tank, which is generally made. We might say that every manufacturer puts the proper size tapping into the tank which is governed by the tank capacity; so there is really no reason for additional holes being made in the tank, and by no means should the additional holes be made about the high water mark. Fig. 2 shows the usual position of the water supply tappings.

Problem III.

The automatic switch would not work in this case, it not having been connected to the pneumatic tank. Now, this is at sight a very simple problem, yet one which to many appears enshrouded in mystery, and without illustrating any particular design, we will show that all pneumatic-electric switches are operated by the internal pressure of the tank, and must be fitted with either an air cylinder and piston or a diaphragm. Very

(Continued on page 30)





BY THOMAS STANFIELD

IN this article is described how a number of furnace fittings and patterns for same are developed. Figs. 1, 2, 3 and 4 describe how the various patterns for a conical furnace top are to be developed.

First draw vertical line AB, and using this line as centre, draw the shape of furnace top, with the deflector as shown. From point A draw dotted lines in line with the desired slope of top. Now with A as centre draw two circles as shown in Fig. 3, from points C and D.

Next develop the plan of top using line A B as centre, this is done by drawing two circles the diameter of C, C¹, and D.D.¹

Next divide the smaller circles into equal parts as shown 1, 2, 3, 4, 5, this being one-quarter of the circle only, by way of illustration. Transfer these measurements to smaller circle as shown in Fig. 3. This will complete one-quarter pattern of the flared or conical top.

The next pattern in order to develop is the deflector which is shown by dotted lines in the elevation at C. E. C.¹ With E as centre open up compass to C. and with this measurement draw a circle as shown in Fig. 4.

Now transfer the measurements described on small circle in plan 4 times, viz. 1 to 16 to the circle Fig. 4, and allow sufficient extra sheet metal to make locks or seams.

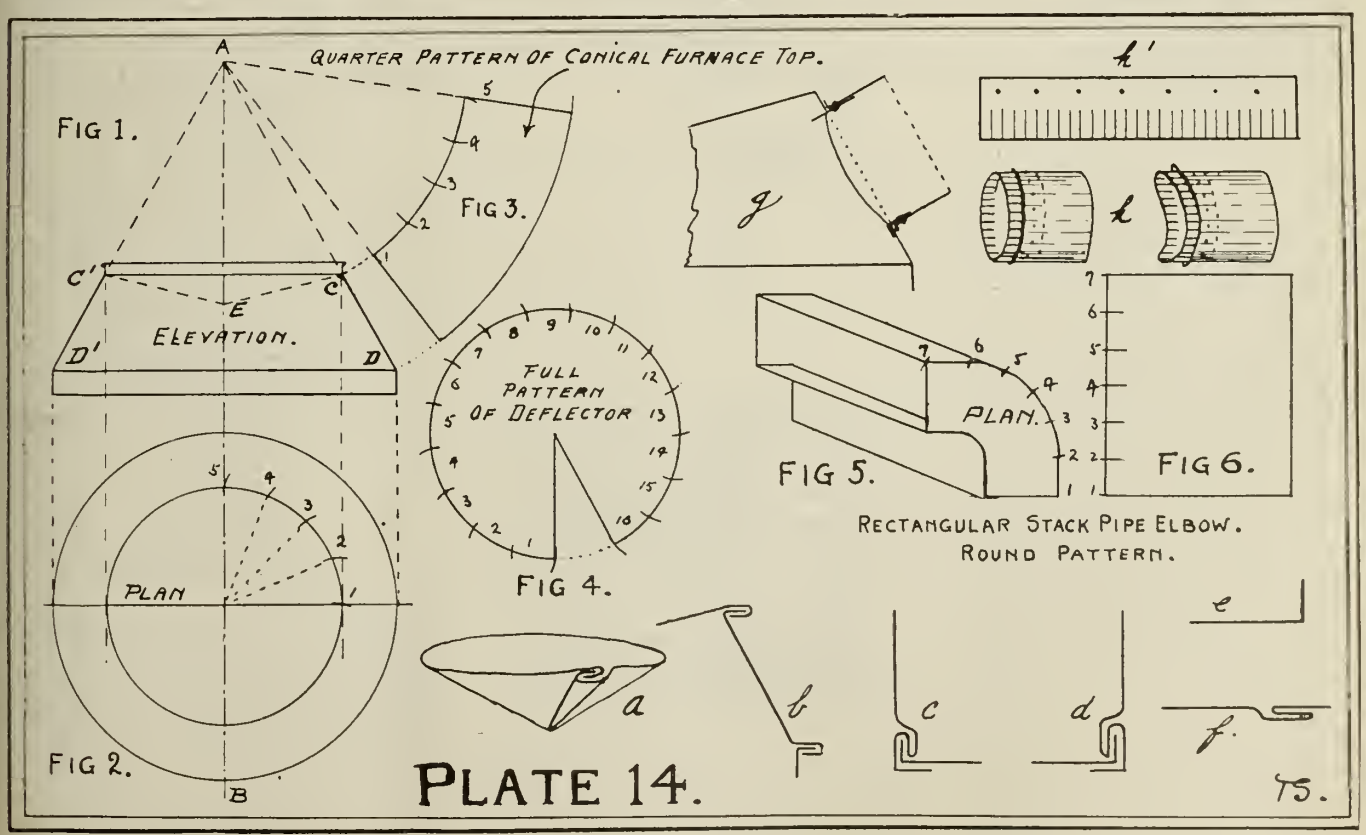
Some furnace men leave about one inch and double rivet this top, this method is quite in order providing a piece of sheet asbestos is put between the faces of the metal.

Fig. A shows a perspective view of the deflector with a locked seam. b shows method of locks for top usually adopted, g shows how a pipe is usually fitted to the conical-shaped top, h describes two styles of collars, h¹ shows a strip of sheet metal which is nicked before riveting same into the collar. In Fig. 5 is shown a perspective view of a rectangular stack pipe elbow, the end of which is used as in plan. The dividing of this, determines the amount of material required for back of elbow, the same operation is required to get length of metal for inner portion of the elbow. Fig. 6 shows the pattern for elbow Fig. 5. The plan of course is self explanatory as it is merely necessary to cut two pieces of metal the shape of plan.

Allowance of course must be made for locks and seams.

Figs. e, d, e, f, describe the form of seam usually adopted, and the amount of allowance depends entirely upon the width of seam to be made.

(Continued in next issue).

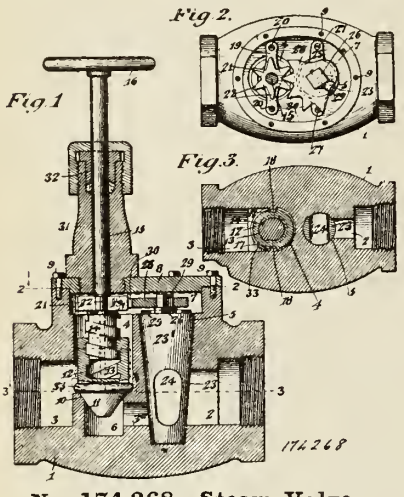


New Canadian Patents

No. 174,268.

Plumus P. Haag, Coffeyville, Kansas, U.S.A., 2nd January, 1917; 6 years. Filed 14th October, 1916. Receipt No. 170,871.

Claim.—1. A valve structure comprising a casing having a passageway for fluid therethrough, communicating spaced apart valve chambers intersecting the passageway at right angles thereto and in parallel relation to each other, valves mounted within the respective chambers, one of the valves being rotatable and the other reciprocable, a manipulating means connected to the reciprocable valve to lower and raise the valve to and from its seat, and means connecting the manipulating means to the rotatable valve for acuating the latter simultaneously with the reciprocable valve, said connecting means being separable, whereby when the valves are in their closed position, the reciprocable valve may be bodily removed without disturbing the other valve.



No. 174,268. Steam Valve.

2. In a valve, a casing having an inlet, and an outlet, separate valve chambers provided in the casing between the inlet and outlet, and a channel leading from the side of one of the valve chambers to a point below the valve seat of the other chamber, in combination with a rotatable valve located in the chamber nearest the inlet, a reciprocable valve mounted in the other chamber, a rotary valve stem, means connecting the stem to the reciprocable valve to raise and lower it from its seat, and separate means connecting the said stem with the rotatable valve to turn the latter, the last-named connecting means being separable, whereby the reciprocable valve may be removed bodily from the valve structure at will without disturbing the position of the rotatable valve.

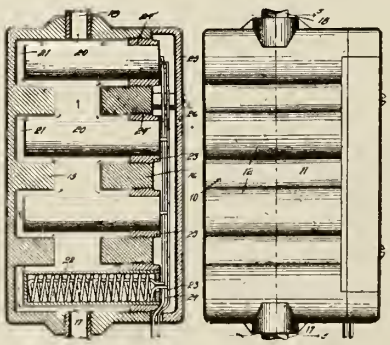
3. A valve comprising a casing having a passage there-through with inlet and outlet openings, a rotatable tapered valve adjacent to the inlet opening and at right angles to the passage through the casing, a reciprocatory valve in the casing movable in a direction parallel with the longitudinal axis of the first-named valve and located adjacent to the outlet opening, means individual to the valves for retaining them in place, and means common to both valves for simultaneously rotating the first-named valve and reciprocating the second-named valve to control the flow of fluid through the valve, whereby when the valves are closed the reciprocatory valve may be bodily removed from the casing without opening the passage therethrough.

4. A valve structure comprising a casing with a passageway therethrough and with valve chambers intersecting the passageway and spaced apart lengthwise of said passageway, and said casing being also provided with a chamber into which each valve chamber opens, a valve in each valve chamber, interconnected actuating means for moving both valves simultaneously to the open or closed position and located in the last-named chamber, manipulating means for the actuating means, separate removable retaining means in the last-named chamber for the valves, and a removable closure for the last-named chamber, whereby when the valves are closed, the valve remote from the inlet to the casing may be bodily removed without opening the passageway through the casing.

No. 174,293.

George M. Patterson, Fairfield, Maine, U.S.A., 2nd January, 1917; 6 years. Filed 6th April, 1916. Receipt No. 263,902.

Claim.—1. In a liquid heater of the character described, a shell having its side walls bulging outwardly at spaced intervals providing enlarged chambers which are connected in series by passages, heating tubes extending into the enlarged chambers, and electrical heating devices arranged within the heating tubes, substantially as described.



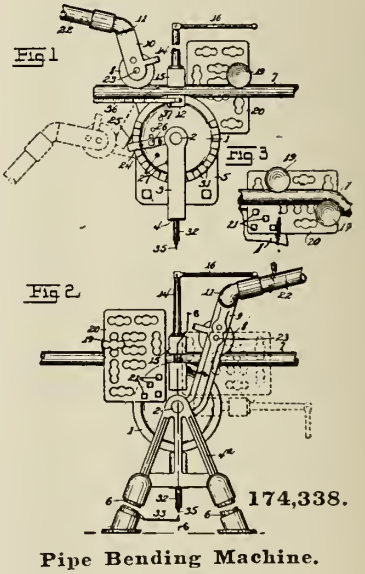
174,293. Electrical Water-Heater.

2. In a liquid heater of the character described, a shell having its side walls provided at spaced intervals with curved outwardly bulging portions providing substantially cylindrical enlarged chambers having communication with each other, substantially cylindrical heating tubes arranged substantially concentric within the heating chambers heating coils arranged within the tubes and a circuit connected with the coils.

3. In a liquid of the character described, a shell having its side walls provided at spaced intervals with curved outwardly budging portions providing substantially cylindrical enlarged chambers, transverse partitions arranged within the shell between the chambers with their ends spaced for affording contracted passages establishing communication between the chambers, heating tubes connected with one wall of the shell and extending into the chambers with their free ends spaced from the opposite wall of the shell, heating coils arranged within the tubes, and means to supply current to the coils.

No. 174,338.

Ray Lealand Davis, assignor, Guy Colfax Moyers, and Roxie Warren Moyers, assignee of a third interest, all of Wheeling, West Virginia, U.S.A., 2nd January, 1917; 6 years. Filed 26th June, 1916. Receipt No. 267,104.



Pipe Bending Machine.

Claim.—1. A pipe bending apparatus comprising a bending wheel having a circumferential groove therein, an arc-shaped shoe adapted to be detachably mounted in said groove, means for clamping a pipe on the outer face of said shoe, and means mounted on the axis of said wheel and adapted for movement whereby the pipe is bent about the face of said shoe.

2. A pipe bending apparatus comprising a support, a wheel rotatably mounted upon said support, means for clamping a pipe against the periphery of said wheel, ratchet and pawl mechanism whereby the position of said wheel may be adjusted, and means mounted on the axis of said wheel adapted for movement adjacent to the periphery of the latter whereby the pipe bent about said periphery.

2. A pipe bending apparatus comprising a support, a wheel rotatably mounted upon said support, means for clamping a pipe against the periphery of said wheel, ratchet and pawl mechanism whereby said wheel may be held in adjusted position, and a lever operated wheel adapted to be rotated adjacent to the periphery of the first-mentioned wheel for bending the pipe about the latter.

4. A pipe bending apparatus comprising a support, a wheel rotatably mounted upon said support, ratchet and pawl mechanism whereby said wheel may be held in adjusted position, a yoke having pivotal relation to the axis of said wheel, a wheel rotatably mounted in said yoke and located in opposing relation to and at a spaced distance from the periphery of the first-mentioned wheel, means for clamping a pipe against the periphery of said first-mentioned wheel, and means for swinging said yoke downwards for bending over said periphery a pipe secured by said clamping means and interposed upon said wheels.

5. A pipe bending apparatus comprising a support, a wheel rotatably mounted upon said support, ratchet and pawl mechanism whereby said wheel may be held in adjusted position, a yoke having pivotal relation to the axis of said wheel, a wheel rotatably mounted in said yoke and located in opposing relation to and at a spaced distance from the periphery of the first-mentioned wheel, a fixed jaw carried by said first-mentioned wheel, a movable jaw for clamping a pipe against the periphery of said first-mentioned wheel, and means for swinging the yoke downwarde for bending a pipe interposed between said wheels and secured by said jaws.

6. A pipe bending apparatus comprising a support, a wheel rotatably mounted on said support ratchet and pawl mechanism whereby said wheel is maintained in adjusted position, a yoke having pivotal relation to the axis of said wheel, a wheel rotatably mounted in said yoke and located in opposing relation to and at a spaced distance from the periphery of the first-mentioned wheel, a jaw carried by said first-mentioned wheel, an adjusting screw mounted in said jaw, a second jaw disposed in overlying relation to the first-mentioned wheel and mounted in swivelled relation to said adjusting screw, said second jaw being adapted to clamp a pipe interposed between said wheels in rigid relation to the first-mentioned wheel, and hand operated means for lowering the yoke carried wheel for bending the pipe over the periphery of the first-mentioned wheel.

New Sanitary and Heating Goods

BETHALTO WATER SYSTEMS

A very interesting book entitled Bethalto Water Systems, is being distributed to the trade by the Southern Auto & Machinery Co., 116-118 Robert Ave., St. Louis, Mo. It is highly illustrated and describes a big range of pneumatic water systems. Fresh water from the well type as well as automatic air lift systems, typical installations are described very fully which makes the book of value for reference. It can be procured for the asking by writing to the above address.

CLAY TILE PIPE BOOK

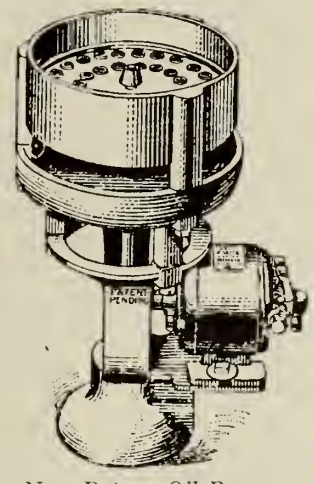
A book describing the manufacture of clay tile pipe is being issued by the International Clay Products Bureau, Kansas City, Mo. It is highly illustrated, showing the various processes by which this line of goods are made.

Information as to how clay tile pipe should be laid, capacity of pipes, etc., in the form of tables also appear in this book. It can be procured free on application from the above concern.

OIL BURNERS FOR HOUSE HEATING SYSTEMS

Another specialty has recently been put on the market, which will prove a good source of revenue as well as a very serviceable appliance for the home owner, that of an oil burner, which can be equipped to an already existing round or square fire-pot, hot water, steam, or hot air furnace.

We are informed that this new appliance, known as the rotary oil burner,



New Rotary Oil Burner.

will consume regular fuel oil, or kerosene equally well, is cheaper to operate, requires very little attention, and consumes a very small amount of electric current. It is operated by a small one-twentieth horse-power electric motor, which requires no special wiring. Further particulars may be procured from the manufacturers, the National Rotary Oil Burner Company, 235 Congress St., Boston, Mass. The above shows an illustration of this new appliance.

PIPE THREADING MACHINES

Shortage of labor, and the adoption of more up-to-date business methods has resulted in sanitary and heating engineers putting more and more faith in pipe cutting and threading machines.

Shops all over the country are buying these machines and are already wondering how in the world they did not use them before. A book on pipe threading machines was almost as rare as a shop with such machines in operation, which is not by any means the case these days.

The Merrell Mfg. Co., Toledo, Ohio, have issued a book which contains some very valuable information on this phase of the sanitary and heating trade, and we are told it can be procured free on application, from the above company.

PRACTICAL INSPECTOR WANTED

When Commissioner Craig, of Halifax, N.S., recommended that a practical plumber be appointed to inspect plumbing, he must have given many a "cheap skate" in Halifax a shock, recently. But in spite of that he is right. If every town in Canada were required to have all plumbing inspected annually, and in course of construction, the public would not be the victims they are at the hands of the "curbstone plumber." There are a number of men in Canada who make a practice of looking up records to see if there is a practical inspector on the job and if there is not, that town proves to be a happy hunting ground for that "botch." But we see a silver lining behind the dark cloud, in the fact that men like Commissioner Craig are becoming more numerous, and none too soon, says The SANITARY ENGINEER.

Trail, B.C.—The City Council propose spending $80,000 for extensions to the water works plant. A by-law will be voted on.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Price advances in plumbing lines and in lines which have a vital bearing on the trade have been numerous since the date of last issue. Wrought iron pipe has made a further increase of $6 per ton and soil pipe and fittings have been moved to higher levels. Malleable fittings in Class A have been increased and nipples up to 4-inch are now quoted at higher figures. There has been a change upward in high grade globe, angle and check valves and in high grade radiator valves. Range boilers have been advanced $1 each. Black sheets are quite generally selling at higher prices. Big advances have been recorded in solder, solder wire and wiping solder. The situation in this commodity has been largely governed by the increased prices prevailing in the tin markets of the world. Boiler tubes have recorded an advance of 10 per cent. It was thought in certain quarters that the top of this market had been reached prior to the recent advance, but the movement now recorded topples over again any such hopes. In the old materials, brass and lead pipe have been increased in price, in the amount being paid for same by the dealers. Business in plumbing lines is quite generally reported good to brisk. There is considerable factory building going on and some apartment buildings have been started. The trade from the country districts generally speaking, is ahead of the city trade. From the mining districts there has been a good demand for materials due to the activity that is going on there.

TORONTO, May 31.—Plumbing supply houses quite generally give encouraging reports of the amount of business that is now being transacted. Manufacturers of valves state they are still booked beyond their capacity, much of the trade coming through the activity now manifested in shipbuilding in this country. There is also considerable business developing through the building of new factories and apartment houses. There has been a good demand for apartments owing to the prospect of the high prices for coal next winter. The number of advances in lines affecting the plumbing trade have been quite numerous during the time intervening since last issue.

Soil Pipe And Fittings Go Higher

SOIL PIPE, FITTINGS.—An advance in the price of medium and extra heavy soil pipe up to 6-inch, has been made effective during the past week, being now quoted at a discount of 45 per cent. off list. Eight inch soil pipe is now quoted at 35 per cent. off list. Medium and extra heavy fittings are now quoted at 50 per cent. off list, the former discount being 50 and 10. Malleable fittings in Class A have been advanced and are now quoted at 20 per cent. on list. Nipples up to 4 inches have been moved to higher levels and are now quoted at 50 per cent. off list. There is a range in the market on some of the other commodities and where this occurs two prices are given in the list below.

Medium and extra heavy soil pipe, 6-inch and under	40%	45%
8-inch soil pipe	....	35%
Medium and extra heavy fittings, and under	....	50%
Cast iron fittings	30%	32½%
Malleable fittings, Class A	20%	on list
Do., Class B and C	Net	list
Cast elbows, tees, etc.	30%	32½%
Unions up to 3-inch	....	50%
Plugs	40%	42½%
Bushings	40%	42½%
Flange unions, standard	....	40%
Nipples, up to 4-inch	....	50%
Do., 4½-inch and larger	....	45%
Do., running thread 4-in. and under	....	30%
Dart unions, ¼-inch to 2-inch	23%	25%

Globe, Angle And Check Valves Higher

VALVES.—High grade globe, angle, and check valves have increased in price in certain quarters, now selling at 7½ per cent. discount off list, as compared with 10 per cent. formerly. High grade radiator valves have also been increased with some wholesale concerns, making the discount now 7½ per cent. off list. Other makes of valves remained unchanged during the time since last issue. There is a continued good demand for valves from shipbuilding concerns, this business being sufficient to keep some concerns booked up beyond their capacity.

	Discount off list
Ground work	35-53
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0 standard	49-53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	7½
Radiator valves, standard	15
High grade	7½
Patent quick opening valves	55
Basin Cocks–	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	35-40
Radiator valves, standard	40
Radiator valves, Jenkins disc	45
Radiator valves, quick opening	45

Enamelware Business Reported Good

ENAMELWARE.—The heaviest demand for enamelware at the present time is reported to be coming for repair work. For this class of work it is stated to be reasonably good. There is also a fair demand for enamelware for new buildings, which is coming largely from rural districts. Prices have held steady during the time intervening since last issue.

Bathtubs, 3oll-top, 4, 4½, 5 feet, 24 to 30 in. wide	$28.50
Bathtubs, 5½ ft.	32.10
Sinks, roll-top, 18 x 30 in., staple	14.60
Closets	21.00

Oakum Prices Hold In Steady Market

OAKUM.—There has been a steady demand for oakum during the past week and prices have remained unchanged. Plumbers' spun oakum is being quoted at a range of $8.50 to $9 per hundred pounds in bales.

	Per 100 lbs.	
Best American	$20.75	$21.00
U.S. Navy (American)	....	20.00
Plumbers' Spun	8.50	9.00

Range Boilers Advance $1 Each

RANGE BOILERS.—An advance of $1 on range boilers was recorded during the week, which makes the selling price of standard 30-gallon now $12 and of extra heavy 30-gallon $14.50. The advance follows on a firm and advancing market for galvanized sheets of all kinds. There is furthermore a scarcity of these materials.

30-gallon range boilers, standard	$12.00
30-gallon range boilers, extra heavy	14.50

Wrought Pipe Again Goes Up $6 Per Ton

WROUGHT PIPE.—A further advance of three points in the price of wrought iron pipe made effective this week provides for an increase of $6 per ton. This advance follows on the heels of one recorded last week and which was effective from May 3. Scarcity of raw materials for the manufacture of pipe has made necessary a succession of advances within recent weeks. New net prices will be found in a panel elsewhere in this issue.

WROUGHT IRON PIPE

Effective May 14, 1917

Size	Black Per 100 feet	Galvanized Per 100 feet
Standard Buttweld		
⅛ in.	$ 4 50	$ 6 00
¼ in.	4 96	7 00
⅜ in.	4 96	7 00
½ in.	6 29	7 86
¾ in.	7 94	10 06
1 in.	11 73	14 88
1¼ in.	15 87	20 13
1½ in.	18 98	24 06
2 in.	25 53	32 38
2½ in.	40 95	51 77
3 in.	53 55	67 70
3½ in.	66 24	83 26
4 in.	78 48	98 65
Standard Lapweld		
2 in.	28 49	34 97
2½ in.	42 71	52 94
3 in.	55 85	69 23
3½ in.	68 08	86 02
4 in.	80 66	101 90
4½ in.	93 98	118 70
5 in.	109 50	138 40
6 in.	142 10	179 50
7 in.	185 60	232 05
8 L in.	195 00	243 75
8 in.	224 60	280 80
9 in.	269 10	336 38
10 L in.	249 60	312 00
10 in.	321 40	401 70

Prices—Ontario, Quebec and Maritime Provinces

Solder And Lead Make Big Advances

LEAD AND ZINC PRODUCTS.—An advance of 4½c per pound has been recorded in the price of solder during the week due to the firmness in the tin market and to higher price for pig lead. Lead sheets have also advanced ¾ cents per lb. Wiping solder has made an increase of 6c per lb. and solder wire 8¾c. Big advances were recorded in the market for tin during the week and this was the factor that dominated the situation in solder. Demand for lead and zinc products has been good. Following are prices now prevailing:—

Lead pipe, lb.	$0.17	....
Lead waste pipe, lb.	0.18	....
Lead traps and bends	15% on list	
Lead wool, lb.	0.16	....
Lead sheets, 3 lbs. sq. ft.	0.16¾	.....
ead sheets, 3½ lbs. sq. ft.	0.16¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0.16½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0.42	....
Solder, strictly, lb.	0.41½	....
Solder, commercial, lb.	0.40	....
Solder, wiping, lb.	0.40	....
Solder, wire, lb.	0.45	....
Zinc sheets, per lb.	0.26	....

Boiler Tubes Go Higher 10 Per Cent.

BOILER TUBES. — Following advances that have been made in the United States to the extent of 15 per cent. within recent weeks an advance has been made effective in the local market to the extent of 10 per cent. This advance is in line with higher prices prevailing in Quebec. Demand for boiler tubes this season has been very good when the time of year is taken into consideration. Stocks are very low in boiler tubes. In 1-inch cold drawn the new price is $27 per 100 feet, whereas the former price was $24. Other sizes have advanced in proportion. Dealers in boiler tubes state the demand for these goods is unusually good for this time of year. Prices are firmly held as a result of the condition with the manufacturers in the United States. Following are the new prices of cold drawn and lapweld:

	Per 100 Feet Cold Drawn	Lapweld
1-inch	$27 00	$ ....
1¼-inch	33 00	....
1½-inch	35 00	30 00
1¾-inch	38 00	30 00
2-inch	38 00	30 00
2¼-inch	40 00	35 00
2½-inch	46 00	36 00
3-inch	52 00	42 00
3¼-inch	....	48 00
3½-inch	62 00	52 00
4-inch	76 00	65 00

Black Sheets Have Increased By 40c

SHEETS, PLATES.—There has been a further increase of 40c per hundred pounds in certain quarters on black steel sheets which now makes the No. 10 gauge $7.90 and the No. 28 gauge $8.10 per hundred. The increase follows a recent advance made effective from the mills in the United States. Boiler plates have also shared in the advance, the range of prices on ¼-inch now being from $8 to $9 per hundred. There is an exceptionally heavy demand for these places at the present time for shipbuilding and conditions bordering on a panic prevail in the scramble to get them. Following is the range of prices now prevailing:—

	Per 100 lbs.	
10 gauge	$7 50	$7 90
12 gauge	7 55	8 00
14 gauge	7 45	7 90
16 gauge	7 50	8 00
18-20 gauge	7 30	7 90
22-24 gauge	7 35	7 95
26 gauge	7 40	8 00
28 gauge	7 50	8 10
29 gauge	7 60	....
¼-inch boiler plate	8 00	9 00

Premier sheets have advanced to the following figures:

	Per 100 lbs.
10¾ oz.	$9 50
U.S. 28	9 20
U.S. 26	8 90
22 and 24	8 75
18 and 20	8 60
14 and 16	8 45

F.O.B. Hamilton, Toronto.

Corrugated Sheets Hold In Firm Position

CORRUGATED SHEETS.—With the firm situation that has developed in black and galvanized sheets there is a sympathetic condition in the market for morrugated sheets. Demand is reported fair for these sheets. Metal shingles and siding metal have also had a fair demand. Prices remain unchanged during the week.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$7.25-$7.75	$ 6 00
No. 26 gauge	8.00- 8.50	6 75
No. 24 gauge	12 00	9 00
No. 22 gauge	14 50	11 00
No. 20 gauge	17 00	13 50
No. 18 gauge	22 00	17 00

Old Brass And Lead Pipe Higher

OLD MATERIALS.—An advance of ½c per pound in the price being paid for tea lead was recorded during the week, and in heavy lead pipe ¾c. Red brass was advanced 2c per pound, and light brass increased ½c. Heavy copper went up again to 26½c, an advance of 1½c. In old rubbers, boots, and shoes there was an advance of ¼c. The market for old materials is one of strength, as dealers report there is a good demand for nearly all commodities. Following are the prices now prevailing:—

Tea lead	$ 0 07½	.....
Heavy lead pipe	0 10¾	.....
Yellow brass	0 15½	0 16
Red brass	0 22	.....
Light brass	0 11½	.....
Scrap zinc	0 09	.....
Heavy copper	0 26½	.....

Metals Still Show A Firm Tone

PIG IRON.—Locally pig iron is unchanged and a quotation of $50 is the only one obtainable. The tendency of the market is still upwards. Prices in the United States have advanced $2 to $3 ton.

TIN.—The market is firm but quiet, and the strength shown during the past two weeks is still evident. Prices here are little or no higher than prices quoted in New York. Locally the price is 65c-67c lb.

COPPER.—The market locally is firm and unchanged. In the U.S. the trade is anxiously awaiting the fixing of the price of copper to the government. There have been reports that the price will be around 24-25c lb. Locally prices are unchanged at 37½ to 38c lb.

LEAD.—The lead situation locally is unchanged. In the New York market trading has been temporarily suspended, as dealers do not appear to have stocks and producers are only taking care of special customers who have contracts. The "Trust" price at New York is 10c, with independents asking 10½ to 11c. Sales are reported at 10.65 for June and 10.50 for July. Quotation locally remains at 13½c lb.

SPELTER.—Since last report the zinc ore market advanced and was followed by a decline. The market still shows strength. Locally quotations are unchanged at 11½c to 13½c lb.

ANTIMONY.—There is a quiet but firm tone to the market. Quotations range from 30 to 35c lb.

ALUMINUM.—There is no change in the situation. The market is firm at 68c lb.



GOSSIP OF THE TRADE

GENERAL TRADE NEWS

Saskatoon.—Seater & Parnell, plumbers; have suffered small fire loss.

Tillbury, Ont.—The Town Council contemplate installing a pumping plant.

Winnipeg, Man.—D. Seebach & Company, plumbers, and tinsmiths, have been sold out.

Mimico, Ont.—Lieut. C. L. Heather, formerly in the plumbing business here, has been wounded at the front.

Guelph, Ont.—An increase in salary of $100 per annum has been granted the Sanitary Inspector of the town.

New Liskeard, Ont.—A by-law to raise $6,000 for the sinking of three new wells has been passed by the Council.

Rainy River, Ont.—J. Boudreau recently employed as a steamfitter in the C. P. R. shops at Winnipeg, has returned here.

Hespeler, Ont.—A by-law to raise $14,000, to provide for extensions to the waterworks system, has been passed by the ratepayers.

Port Huron, Mich.—The Fibrous Garment Company, may erect a factory at Wyoming, Ont., for manufacturing sanitary specialties.

St. John N.B.—The annual meeting of the Maritime Provinces branch of the Canadian Manufacturers' Association will be held in St. John on May 30.

Port Dover, Ont.—A water works system and sewage system are being considered for Port Dover, the approximate cost being put at $65,000. It is likely that a by-law will be submitted to the people in August next.

NEW ADDRESS

The Consolidated Rubber Co., Ltd., have moved their executive offices, the sales department of their Montreal branch, and the raincoat manufacturing dept. to the Rubber Building, 201 Inspector St., Montreal.

REPORTED WOUNDED

Word has been received in Toronto that Pte. H. B. Lynn has been wounded and is now in the Canadian General Hospital at Boulogne. Pte. Lynn was in business as a sanitary engineer on Dundas St., Toronto, before he joined the fighting forces. He is 24 years of age, was a good mechanic, and a subscriber to the SANITARY ENGINEER. He went overseas with the battalion commanded by Lt.-Col. Kingsmill, and is reported as having been wounded in the left shoulder and neck. The SANITARY ENGINEER joined with the friends of Brother Lynn in wishing him a speedy and permanent recovery.

WINNIPEG VISITOR

Major L. L. Anthes, of the Anthes Foundry, Ltd., Toronto and Winnipeg, is paying a visit to the latter city. He will likely be away for several weeks.



Major L. L. Anthes, Toronto.

Major Anthes has not been in Winnipeg since the beginning of the war, being very actively engaged in military work. He believes that every man's most important business is that of bringing this dreadful war to an end, and in fact the ending of all war.

Appointed Chairman of Toronto Canadian Manufacturers' Association

In business circles, Mr. Anthes enjoys the confidence of a great number of friends, as was shown recently when he was appointed chairman of the Toronto branch of the Canadian Manufacturers' Association.

The SANITARY ENGINEER joins its many readers in wishing him all kinds of pleasure in this his new appointment, knowing full well hard work is one of the greatest pleasures he enjoys.

TRADE OUTLOOK NOT BRIGHT

The Toronto Domestic, Sanitary and Heating Engineers' Society, reported at their meeting recently that on account of the high price of materials prospects in the building trade were not bright, and asked the Government to investigate conditions surrounding the metal industries.

NEW FIRM IN GALT

Galt Building Products, Limited, has been incorporated at Galt, with a capital stock of $40,000 under a provincial charter, to manufacture by a secret process, brick, tile, sewer pipe, drain pipe, flooring, tombstones and every form of artificial or ornamental material used inside or outside of buildings. The officers of the new concern are all Galt men; President, E. S. Tolmie; Vice-President, A. Gillies; Sec.-Treasurer, J. Rennie; Board of Directors, W. Ducat, chairman; E. Plested, V. Parker and P. Groh. The company has purchased eight acres of land in Galt and will erect a plant which is expected to be in operation by June 1.

OBITUARY

Winnipeg, Man.—Friends of A. A. Sutherland, traveler in Manitoba and Saskatchewan for the Jas. Smart Mfg. Co., will sympathize with him in his recent bereavement. His wife, aged 24, died on Friday, May 4, and was buried at Winnipeg. She is survived by her husband and a little girl ten days old. Mr. Sutherland is a son of the late manager in Winnipeg for Jas. Smart Mfg. Co.

Galt, Ont.—S. R. Sheldon, vice-president and chief engineer of Sheldon's Ltd., Galt, Ont., the well-known manufacturers of heating and ventilating equipment, died suddenly after an operation for appendicitis, aged forty. Mr. Sheldon was originally with the McEachren Ventilating Co. and about fifteen years ago took over the business with his brother W. O. Sheldon. The company was at a later date incorporated as Sheldons Ltd.

KILLED AT VIMY RIDGE

St. John, N.B.—William S. Gray, formerly employed with T. McAvity & Sons, St. John, was killed in action at Vimy Ridge.

CONTRACTS AWARDED

Guelph, Ont.—The Water Commissioners have awarded the following contracts for annual supplies:—Cast iron pipe, National Iron Works, Toronto; valves, Kerr Engine Co., Walkerville; brass goods, Canada Brass Co., Galt.

AURORA SEWAGE SYSTEM

Aurora, Ont.—At a meeting of citizens held in the Town Hall here on May 2, E. C. James, civil engineer for the county, explained a suggested sewage system for the town, illustrating the plan with diagrams. The setimated cost of the improvement is $80,000, and it was the opinion of the meeting that the matter should not be considered until after the war.

GALT SANITARY INSPECTOR RESIGNS

Galt, Ont.—Ex-Alderman W. H. Anderson recently appointed Sanitary Inspector, has resigned his position owing to a protest voiced by the Great War Veterans' Association. At the time of his appointment no returned soldier applicants were found to be physically fit, but the Council has appointed Charles J. Oughten, a veteran of the 1st Battalion, who lost part of one hand at the front, and matters are satisfactorily adjusted.

NEW TOWN IN TEMISKAMING

The scheme whereby the Riordon Pulp and Paper Company is to build a town of 4,000 people, with houses, pavements, sewers, waterworks, etc., is said to be somewhat delayed owing to a hitch in negotiations between the company and Mr. Lumsden, whose mills were to be taken over and enlarged. Thos. Adams, Ottawa, is consulting engineer on the town-planning, the whole work being under the direction of A. Ferguson, consulting engineer, New York City.

WOULD NOT ORDER STORM SEWER

Hamilton, Ont.—The provincial board of health has refused to order the city of Hamilton to build a storm sewer through Kenilworth survey to relieve flood conditions. After hearing the arguments of Controller Tyrrell and City Engineer Gray of Hamilton, Provincial Health Officer McCullough and F. A. Dallyn, engineer of the department of health, stated that they would not interfere in the matter inasmuch as it was a storm and not a sanitary sewer that it was proposed to build, and therefore did not come within their jurisdiction.

BRUSH SYSTEM WORKS WELL

The brush system as adopted in the North Toronto disposal works in Leaside is giving satisfaction, according to information received recently. It was stated that the water leaving the brush was 98 per cent. pure according to city tntlysis, while that from the stones was but 78 per cent. pure. The officials are still experimenting with the brush system, which was first installed three years ago, and which has given satisfaction ever since. Samples are taken to the City Hall analyst almost daily, and the percentage of impurities in three years has varied very little.

A brief description of the North Toronto disposal works might prove interesting. The sewage first empties into a square, shallow tank, where a portion of the solids is removed, and then passes into a very deep tank, in which the rest or bulk of the solids is removed. The water then flows to a siphon, which automatically controls the outlets to the four purifying apparatuses. These are circular structures sunk in the ground to a depth of about six feet, only about a foot of the wall remaining above the surface. The walls are covered with a circular conical top. In two of these structures are stones and pebbles six feet deep, and in the other two brush is laid to the same depth. The water from the siphon flows to each of these through iron pipes. By a special circular construction of these pipes in the purifying buildings the weight of the water drives them around, thus sprinkling the water evenly over the stones or brush as the case may be. The process of purifying this liquid consists simply of allowing the water to soak through the six feet of stones or brush. The brush has proven to be by far the most effective purifier.

After this the water runs on its course to the Don. The solids are taken a short distance away on a track, where they are eagerly sought by the farmers.

SEWAGE TREATMENT ESSENTIAL

Progress in water purification constitutes one of the brightest pages in the history of sanitary engineering in America during the past 25 years, but much remains to be done both as regards its general adoption and its application where local conditions call for special treatment. Apparently, progress in water filtration has been somewhat retarded through efforts to make chlorination serve as a substitute under conditions where it is not entirely adequate. Chlorination has done much to improve public water supplies. But it is not a cure-all, and its limitations are far more clearly appreciated with the practical proofs now existing than when academically recited six or eight years ago.

Under certain conditions chlorination secures public water supplies of good quality without filtration. The great difficulty lies in gauging the proper amount to be introduced. For many water supplies subject to chlorination without filtration, real difficulties are encountered in so adjusting the dose of chlorine as to guard against objectionable taste and odors on the one hand, and inadequate destruction of objectionable bacteria on the other.

Present day consideration of sewage disposal as related to water supplies assumes that the primary source of supply is not grossly polluted and that any sewage affecting its purity has been treated in order that its filtration for domestic use may not be rendered ineffective through the overloading of the filters. The methods adopted must involve the recognized principle that any water filtration process must begin by the treatment of the sewage before it is allowed to contaminate the source of water supply.—L. G. D.

STRAIGHT TALK TO THE CRAFT

(Continued from page 19)

ter and man. Some may say that such has been tried and proved a failure. To these I will say that the principle is not wrong and if given a fair trial the botch master, as well as the botch mechanic, will soon be sent to a school for improvement or must look to some other occupation by which to earn a living.

Hoping you can find space in your valuable paper for this somewhat lengthy epistle, and wishing your journal the success it deserves, I will remain,

A Journeyman To-day, An Employer To-morrow.

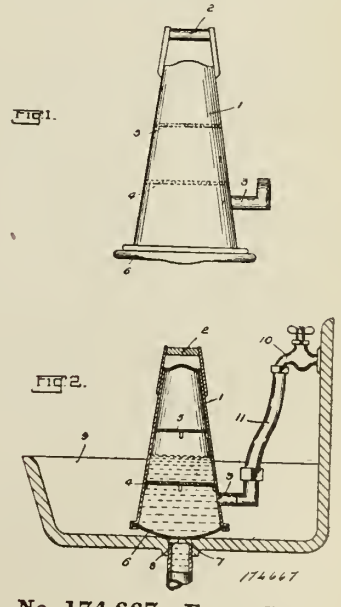
M. McG.

NEW PATENTS

No. 174,667.

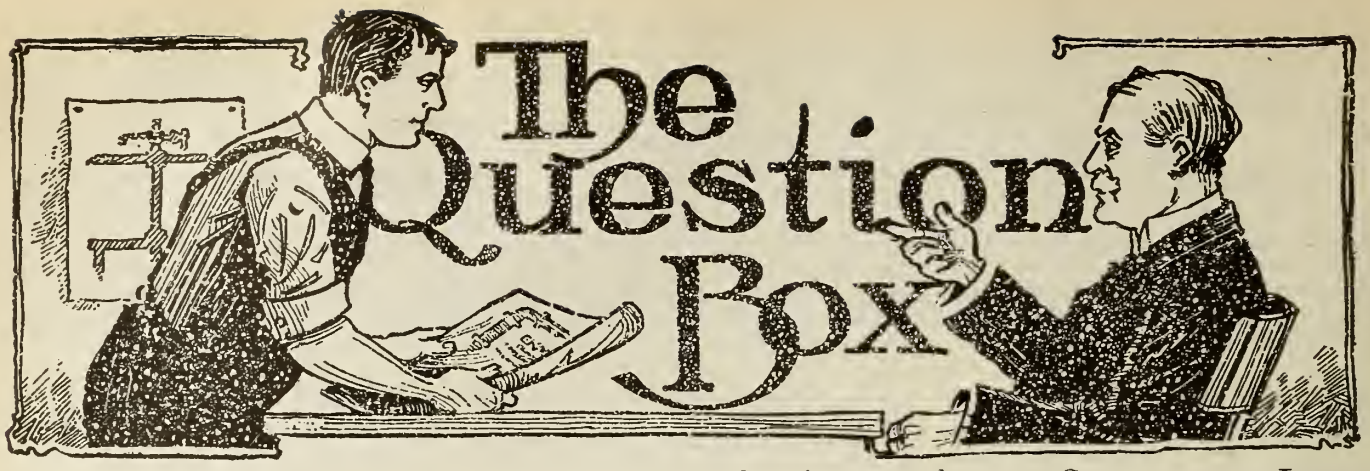
Louis Dalma Hamelin and Philias Grenon, assignee of a third interest, both of Montreal, Quebec, Canada, 23rd January, 1917; 6 years. Filed 1st December, 1916. Receipt No. 272,630.

Claim.—A force cup comprising a rigid conical casing provided at its top with a handle, open at the bottom and provided at one side with a water inlet,



No. 174,667. Force Cup.

a rubber disc suitably secured in the open bottom end of said casing and provided with a central opening adapted to fit over the sink outlet, and a perforated reinforcing plate secured within said casing, substantially as described.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHO MAKES OIL BURNERS FOR HEATING SYSTEMS?

Editor, THE SANITARY ENGINEER:

Do you know of any contrivance for burning crude oil or kerosene to be used instead of coal, that could be attached to a hot water heating plant?

Any information you can give us on this subject will be much appreciated.

Kindly answer through your Question Box.

CURRIE & MURNAGHAM,
71 Queen Street,
Charlottetown, P.E.I.

National Rotary Oil Burner Co., 235 Congress St., Boston, Mass.

Three-O-System Co., Ltd., 353 Yonge St., Toronto.

Fess Oil Burners of Canada, Ltd., Royal Bank Building, Toronto.—Editor.

THE DIFFERENCE IN PUMPS

Editor, THE SANITARY ENGINEER:

I have become more and more interested in pneumatic pumps, as well as pumps in general, and am not familiar with the various types of pumps now on the market. I would like you to show what kind of pumps would come under the following names: Deep well pumps, suction pump, force pump, force and lift pump, shallow well pump, cistern pump, etc.

I am only referring to such pumps as are likely to be installed by the plumbing trade in connection with attic tank, or pneumatic water systems.

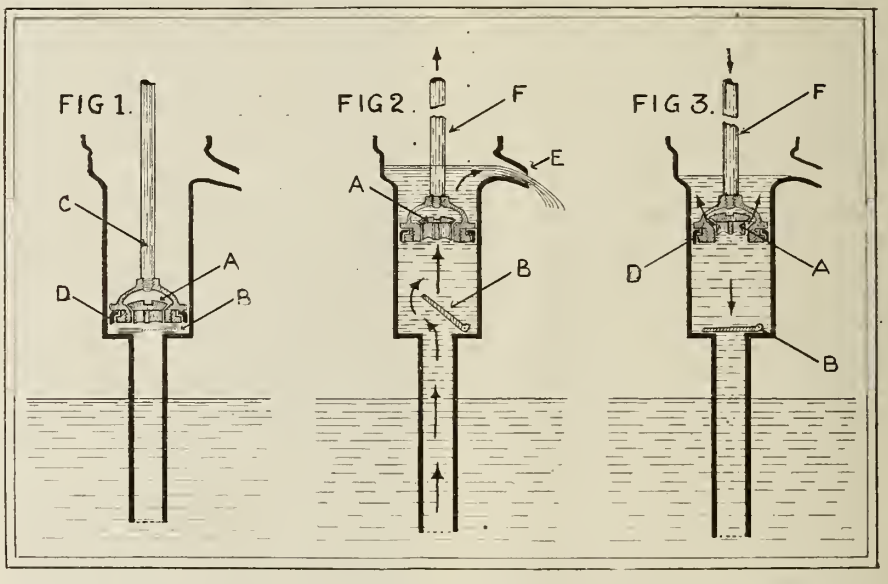
If it would not be too much trouble to you, I would like to see some illustrations of the various kinds of pumps mentioned, with their working parts shown.

COUNTRY PLUMBER.

It is quite possible that our reader does not really know what range of pumps there are which would come under the headings he mentions, and as space will not permit of us describing all these types of pumps in one issue, and make the definitions clear, we will take the first one or two types now and deal with the others in the next issue.

The common suction, or pitcher pump is shown in Figs. 1, 2, and 3, and is of such a type as would be used when the well is near the pump, say 10 to 15 feet at the most. It is simply a single acting suction pump, with two valves, though some pumps have been made with a clack valve as shown in Fig. 1 at A. Such a pump is very seldom made these days, as it was found that it could only be used when situated over the water supply, and only a few feet above the surface, the leather cup D had to be so tight, and the clack A was made of leather and these parts wore out very soon. The next improvement in pumps was made by adding another valve B, Fig. 1. This valve holds the water in the pump cylinder when water has been drawn into it, as soon as the cylinder is filled. The first downward stroke finds the cylinder full of water and valves both closed when in position shown in Fig. 1, but during the period when the downward stroke is being made, valve A is open. Now, when the upward motion is made, valve A closes and valve B opens, and the water above valve A is delivered through the spout E; see Fig. 2. So that the one action draws the water up and delivers the water which is above valve A.

Now, turn to Fig. 3 and note the arrows; the pump is being operated downwards. Valve B is closed. Valve A is opened and the water in the cylinder is being displaced from below valve A to above. No water is being delivered at this period, therefore this type of pump would come under the title of a single action pump; but there are quite a lot of pumps which would come under this head, just as it would be possible to have a double action pitcher pump, that is a pitcher pump that would deliver a continuous stream of water no matter what the stroke of the pump may be, upward or downward. This pump described, however, is known commercially as a common pitcher pump, or cistern pump. It is the cheapest of pumps, and its service is very limited.



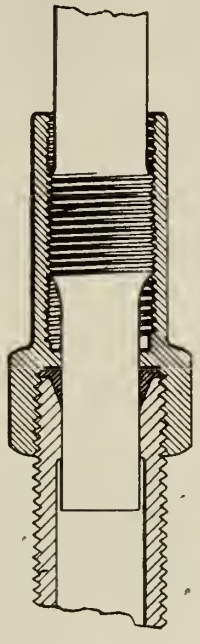
The above remaining questions will be answered in next issue.—Editor.

ADJUSTABLE

Screw Joint Coupling

for Supply Pipes

(Letters Patent No. 162,577)



The illustration shows the principle of application. The threaded shoulder on supply pipe engages internal thread of Screw Joint Coupling, allowing a total adjustment of TWO INCHES.

In addition to the adjustable feature, PACKING RING effectively prevents the possibility of LEAKS.

The Adjustable Screw Joint Coupling represents a combination of Common-Sense and Experience. It has justified expectations that it would perform an ordinary service in an extraordinarily efficient manner.

Fitted on all Noblo Supplies.

Manufactured by

H. Mueller Manufacturing Co., Limited

SARNIA, ONTARIO

INSTALLATION OF PNEUMATIC WATER SYSTEMS

(Continued from page 20)

often the cylinder and piston requires a number of springs to force the piston back when the pressure in the tank is reduced, while a diaphragm operated switch does not.

Fig. 3 is a rough sketch of the diaphragm valve. The principle upon which it operates is very much the same as a common damper regulator, such as is fitted to many of our steam boilers and the pressure is exerted below the diaphragm forcing up a rod or piston; this movement operates either a cam or lever, which in turn puts the electric switch into operation in very much the same way as the damper regulator lever opens or closes the check or draft door on a steam plant.

It will therefore be readily seen that all automatic switches used in connection with a pneumatic water system must have some connection made to the pneumatic tank, and all such appliances should be connected below the water line.

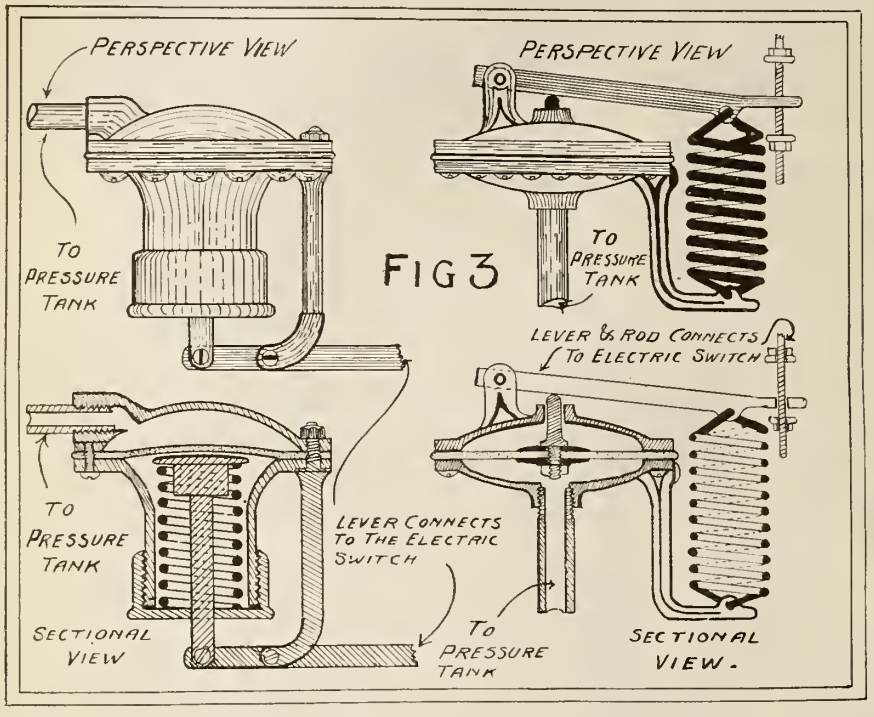
The next problem, No. 4, will be taken up in June 1st issue.

An electrically driven pump was installed in a basement near to the pneumatic tank.

Pump would deliver water for about two minutes, then water would cease to come. Pump lost its priming so the sanitary engineer said.

The above are a few cases that have come to our notice and we will show how these jobs were installed, and why they did not give satisfaction.

(Continued in next issue).



PROBLEM II.

A pneumatic tank appears to be leaking, at least it did not maintain the air. Water could not be got through one of the faucets, a pipe had been taken off top of tank above high water line.

PROBLEM III.

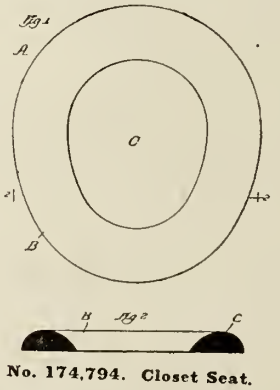
An electric switch would not operate, the pipe to the diaphragm had not been connected to the tank.

NEW PATENTS

No. 174,794.

The Brunswick-Balke-Collender Company of Canada, Limited, Toronto, Ontario, Canada, assignee of Michael James Whelan, Muskegon, Michigan, U.S.A., 30th January, 1917; 6 years. Receipt No. 238,950.

Claim.—1. A water closet seat comprising a solid core consisting of a hard rubber compound of relatively inexpensive character densely compressed and partially vulcanized, and a veneer of hard vulcanized rubber of a quality capable of taking a high polish completely enclosing said core and integrally united with the entire surface thereof.



No. 174,794. Closet Seat.

PURO

(MADE IN CANADA)

Every minute counts in getting maximum efficiency.

Our Puro Sanitary Drinking Fountains positively save 60% in drinking time, besides 35% of water ordinarily wasted. Can you afford to run your plant and lose and waste this money in old-fashioned drinking methods?

EFFICIENCY IS PATRIOTISM



Ask your efficiency expert to figure this out and you will find that:

500 men drink, say, twice a day. Under old conditions it takes between 3 and 5 minutes per man, twice a day. With PURO cutting the time in half, it would save from 1,500 to 2,500 minutes per day at an average wage of 20c per hour. The saving would be from $5.00 to $8.50 per day.

How long would it take to pay for installing our fountains?

NOW IS THE SEASON TO THINK OF YOUR WATER PROBLEMS.

ASK OUR EXPERT ADVICE.

Puro Sanitary Drinking Fountain Co.
147 University Ave., TORONTO, CAN.



Vent Caps

Cleaning screws, and drain checks, prevent flooding Machinists, Brass Finishers and Plumbers specialties.

MALCOLM and COMPANY
64 Lombard St., Toronto

FOR SALE

UNDERWOOD TYPEWRITERS.—Modern visible machines equipped with such improvements as back spacer, bi-chrome ribbon, tabulator and automatic ribbon reverse. Five year guarantee. Sold for cash or payments. Free trial. Send for proposition to-day and save more than half regular price. Address, Arthur O. Secord Co., Limited, Dept. 2, Brantford, Ontario.

MORRISON
Automatic Cellar Drainer



A simple, durable, automatic device for draining cellars, wheel pits, furnace pits, cesspools, foundations, and for any purpose where it is necessary to remove water economically from one level to another by water pressure.

The operation of the machine is extremely simple, being actuated by the raising or lowering of float as the water level changes in the pit. It operates purely by water. With our patented improvement it works under a far greater range and gives much larger capacities than any other device on the market, so far as we know, operating as low as 10 lbs. water pressure.

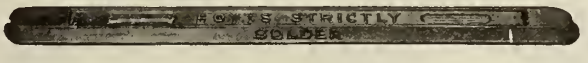
The operating limits of other types of cellar drainers range from 15 to 18 feet lift. The Morrison machine lifts as high as 30 feet at 60 lbs. pressure.

All working parts above water. Nothing to get out of order.

The James Morrison Brass Mfg. Company, Limited

93-97 Adelaide St. W., Toronto

Our Mixed Metal Sales Amount to Over $5,000,000 Annually



HOYT'S WIPING SOLDER is as perfect as experience and first class ingredients can make it. As only one perfect Wiping Solder can be made we manufacture only one grade, which must necessarily be Hoyt's high standard of quality.

Special attention is called to our Bar Solders, Wire Solders, Lead Pipe, Waste, Traps and Bends. Your orders will have prompt and careful attention, not sometimes—but all the time.

HOYT METAL COMPANY, TORONTO, ONTARIO
New York, N. Y.; London, Eng.; St. Louis, Mo.



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

SINCE IT'S ONLY A HANDFUL

WHY LEAVE IT BEHIND?
3 Sizes Capacities ⅛ to 8 inch pipe



WILLIAMS "VULCAN" CHAIN PIPE VISE

Before you return you may need to turn a thread, make a bend, cut off an end or perform any of the other ordinary operations for which a steamfitter is usually summoned.

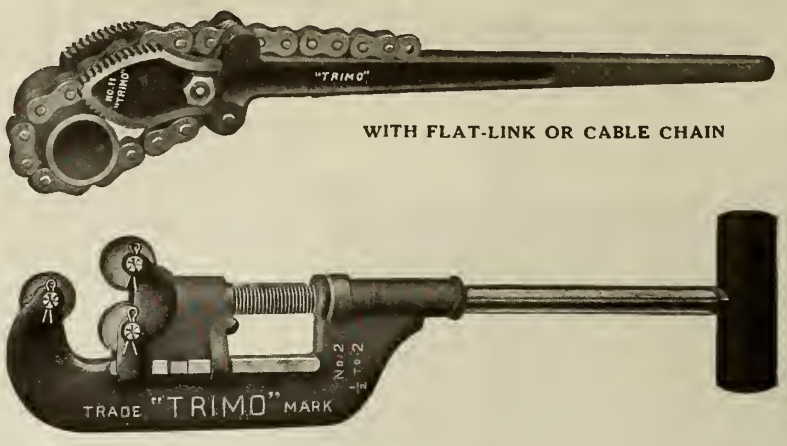
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They won the "Grand Prize" of the P.P.I.E.

J. H. WILLIAMS & CO.
77 Richards Street BROOKLYN, N.Y. CITY
The Wrench People

World-Famed Specimens of the Age of Steel

TRIMO TOOLS



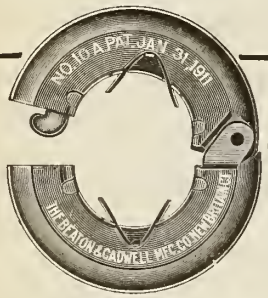
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Send for Catalog No. 91

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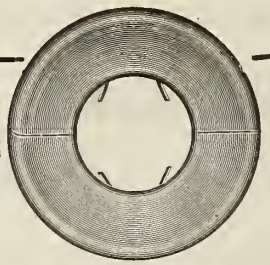
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OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.



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Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

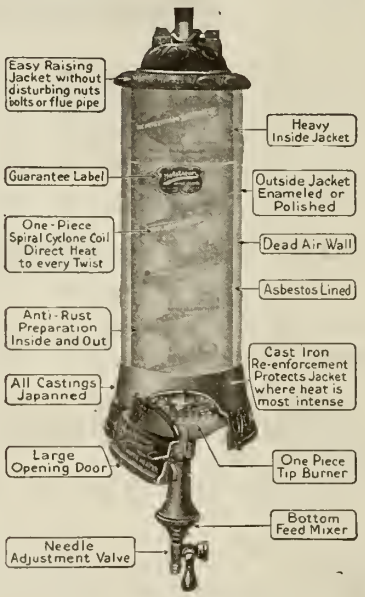
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Quality Survives



Service—Speed—Economy

If your jobber can't supply you—write direct

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CLEVELAND, OHIO

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Isn't it a fact that YOU can buy "Water Heaters" at any old price? But did you ever stop to realize that your CUSTOMER buys the SERVICES of the heater—not the heater itself? Even if he THINKS he wants the cheapest heater made, he EXPECTS GOOD SERVICE, and if he doesn't get it he BLAMES YOU. He FORGETS his only saving is in first cost, yet DEMANDS that it meet with HIS idea of a Water Heater in SERVICE, SPEED and ECONOMY.

Hotstream Heaters are built to meet YOUR CUSTOMER'S VIEWPOINT—he is the man to be ultimately satisfied!

Remember—you can't buy Creamery Butter for the price of Oleo. Yet the price of a Hotstream is small compared to what its EXCELLENT SERVICES justify.

You owe it your business to investigate and compare Hotsream Heaters with those you are using.



IMPERIAL RADIATION

Represents the Most Advanced Method of Heating

Years of experience and research have resulted in the production of a radiator that embodies all that is known to the science of modern methods of heating.

The Imperial Radiator is designed to assist free circulation of water—smooth inside to avoid unnecessary friction.

Has been giving utmost satisfaction for years. Those who know it say that it gives off more heat per square foot than any other make. You are SAFE when you decide in favor of the "IMPERIAL."

Write for Prices

STEEL AND RADIATION, LIMITED

Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

HEAD OFFICE: Fraser Avenue, TORONTO

FOR ALL HEATING INSTALLATIONS SPECIFY KING HOT WATER BOILERS AND RADIATORS.

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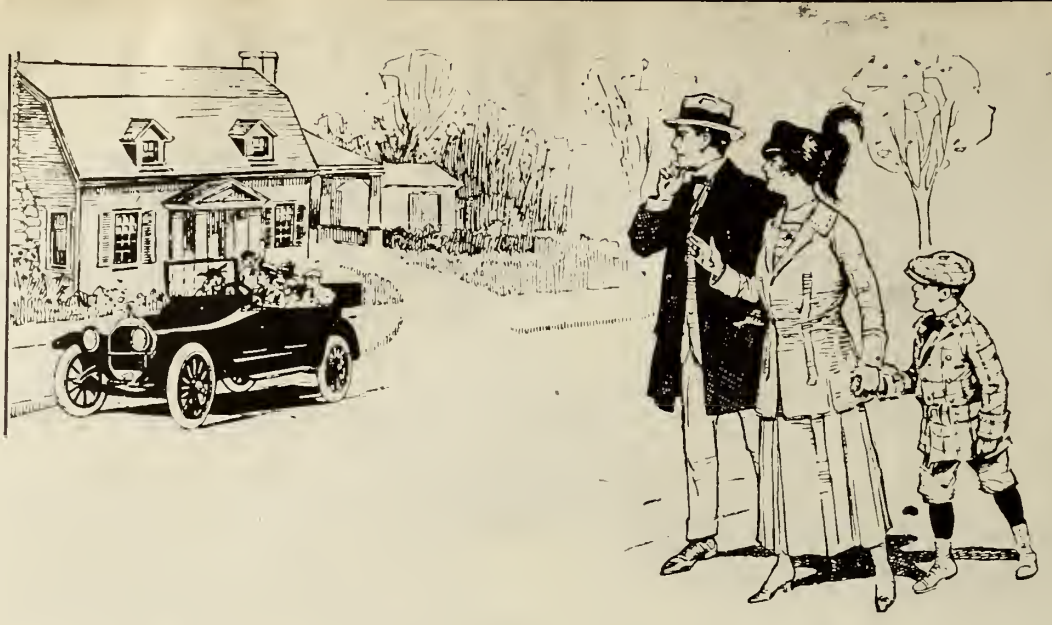
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Williams, J. H., & Co. 32



Success or Failure?

Be perfectly candid with yourself, Mr. Sanitary Engineer—ARE YOU MAKING A SUCCESS of your business?—do you live like other business men or are you plugging along, simply keeping your head above water and working mighty hard to do that?

EVER HEAR OF PROFIT INSURANCE?

Would you consider a proposition whereby your profits would be assured on payment of a small fee—a fee less than what it costs the average man for smokes?

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I will furnish you with a price book containing retail prices on every standard plumbing article and I will guarantee absolutely that these prices will produce you a reasonable profit over and above your overhead expense.

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I have special facilities for watching the markets and sending out new price sheets as the cost prices change. You need have no anxiety about not getting a reasonable price for your goods.

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Did you ever consider the time you lose searching invoices and catalogs to obtain a selling price. Figure this lost time up for a year and then ask yourself if a price service of this kind would not save you Hundreds of Dollars a year.

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One man says: "It's worth $500.00 a year." Another "This service saves its cost many times over in Time-saving alone." Still another: "It's the best idea I have struck yet for pricing my jobs and assuring me of a profit."

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C. A. Dunham Co., Ltd., Toronto.

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Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

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James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
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Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Limited, Galt.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Brass Pipe and Tube.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Drainers.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

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Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., Ont.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.

Country Residence Equipments.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto

Damper Regulators.
W. E. Clark Co., Ltd., Toronto.
C. A. Dunbam Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

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Kerr Engine Co., Walkerville.

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National Equipment Co., Ltd., Toronto.

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Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

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Empire Mfg. Co., Ltd., London, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Flushometers.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
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Speakman Supply & Pipe Co., Wilmington, Del.

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Beaton & Corbin Mfg. Co., Southington, Conn.
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Canadian Wolverine Co., Ltd., Chatham.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Gasoline Engines.
National Equipment Co., Ltd., Toronto.
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Lord & Burnham Co., Toronto.
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Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Canada Metal Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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National Equipment Co., Ltd., Toronto.

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Canadian Wolverine Co., Ltd., Chatham.

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W. E. Clark & Co., Toronto.
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Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.

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Canadian Tube & Iron Co., Ltd., Montreal.
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Steel & Radiation, Ltd., Toronto.

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Pipe Joint Compounds.
Canadian Wolverine Co., Ltd., Chatham.
James Morrison Brass Mfg. Co., Ltd., Toronto.

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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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John Hall & Sons, Ltd., Brantford.
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James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
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C. A. Dunham Co., Ltd., Toronto.

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Empire Mfg. Co., Ltd., London, Ont.
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National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.



Beaver Die Stocks

Full Thread at One Cut

with the

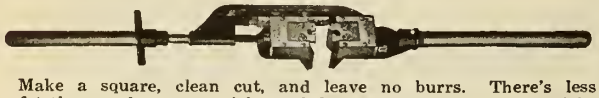
"Beaverette"

A Compact and Complete Tool

NO CHANGING OF DIES—NO BACKING OFF—NO LOOSE BUSHINGS. These are some of the advantages of the "Beaverette" not found in any other tools. Cuts from ⅛ to 12 inches.

One man can cut a 12-in. thread easily with our tool.

Beaver Pipe Cutters



Make a square, clean cut, and leave no burrs. There's less friction on hot water jobs and less wet steam on steam jobs when the Beaver square-end pipe cutters are used.

Manufactured by

The Borden-Canadian Co.
Toronto, Canada

"BEAVER"

Every Sanitary Engineer

Should Make A Practice of Stocking and Selling

A Select Line of

Modern Gas Appliances

There is money to be made if the proper development of the sale of gas appliances is carried on.

Gas Water Heaters particularly appeal to plumbers and sanitary engineers, because there is a certain amount of piping work to be done with each, and the installation of one Gas Water Heater almost invariably leads to the sale of other gas appliances.

We are ready to advise on the correct procedure necessary to make this end of your business profitable, and are always ready to co-operate in work which tends to help the gas industry generally.

For further particulars apply to

The Consumers' Gas Co'y.

12-14 Adelaide Street West, - TORONTO
Phone Adelaide 2180

WROUGHT PIPE

BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized
All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

Montreal Works: Lachine, Can.

Mutual Benefit Chats.—No. 2

MR. SANITARY ENGINEER, are you reading our articles on bookeeping? If you are not, you are losing one of the best opportunities offered you for some time. Any man in business must of necessity know whether he is on the debit or credit side of the ledger, and the only way he can ascertain this correctly is by a system of bookkeeping. We are offering to our readers a system so comprehensive yet so simple that any man who can read will readily understand it. The large number of descriptive illustrations elucidate quite clearly this system which we are giving our subscribers. This is only one of the many features which the readers of the Sanitary Engineer are getting.

Read your copy from cover to cover and procure all the assistance derived therefrom.

DART
UNION ELBOWS

Female, and Male and Female

Save Time and Labor. Two Bronze Seats

NO CORROSION

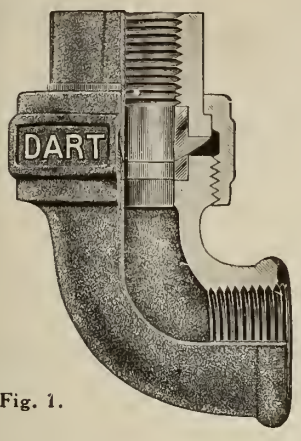


Fig. 1.

By the use of Figure 1 you save two threads, do neater work and make sure that the connection is trouble-proof.

Heavy Malleable Iron Pipe ends and nuts ensure strength and durability. **Dart Unions stay tight**—they never require readjustment.

Nearly twenty years of successful record is your guarantee of the Dart construction.

SOLD BY ALL JOBBERS

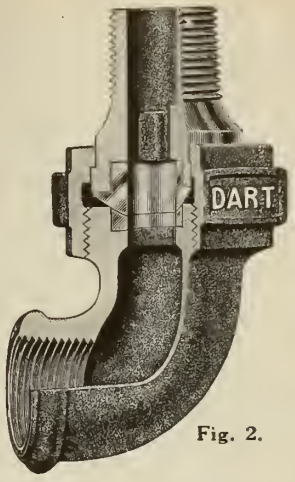


Fig. 2.

Figure 2 is a 4-in-1 fitting. It cuts out nipple and one thread at running end and nipple, elbow and two threads at the elbow end.

Manufactured by

DART UNION COMPANY, LIMITED, - TORONTO, CANADA

KERR GATE VALVES



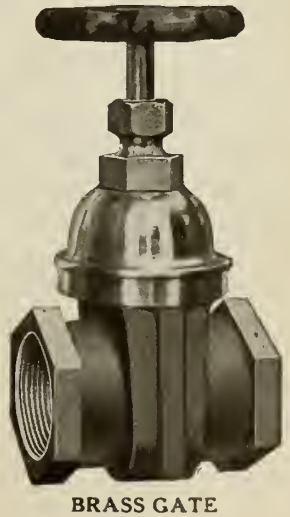
I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.

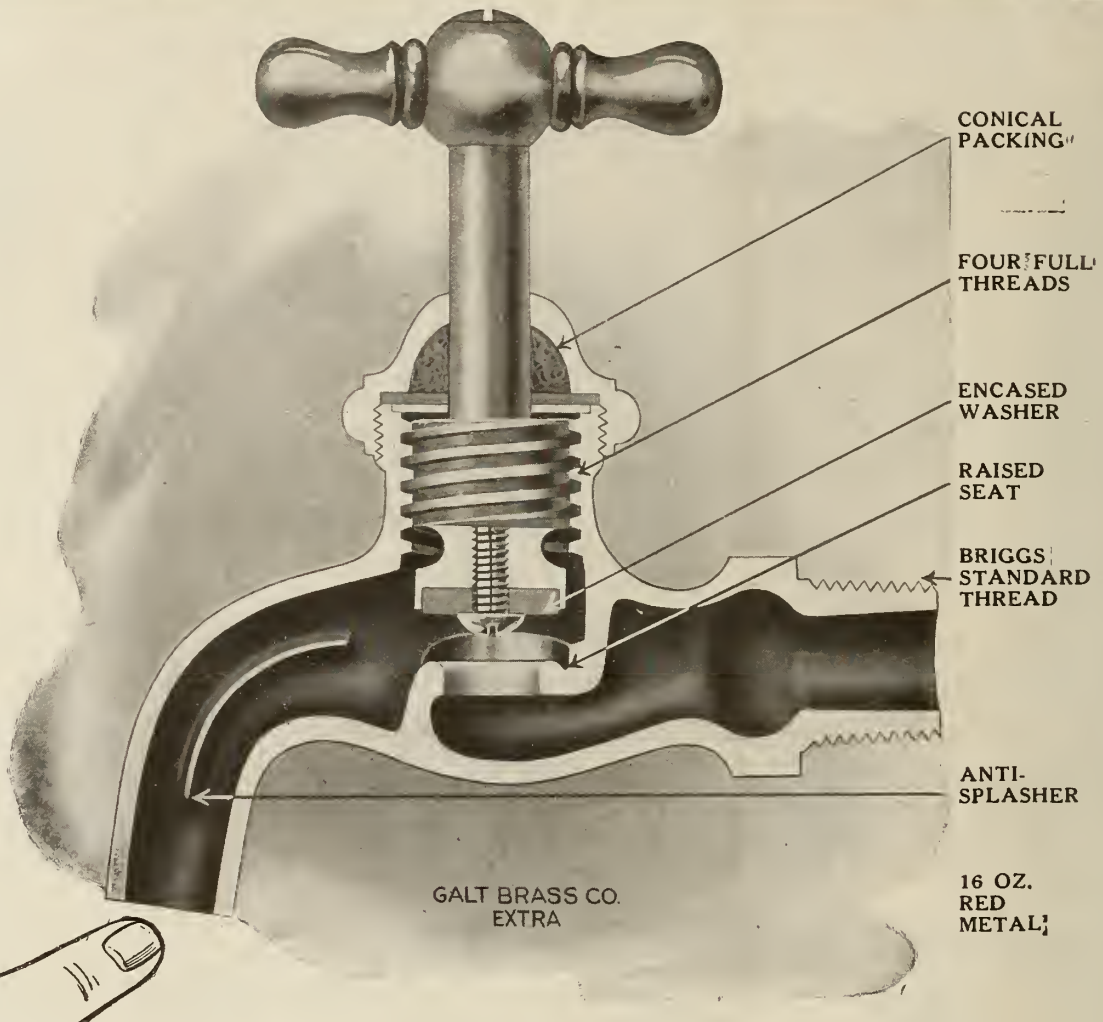


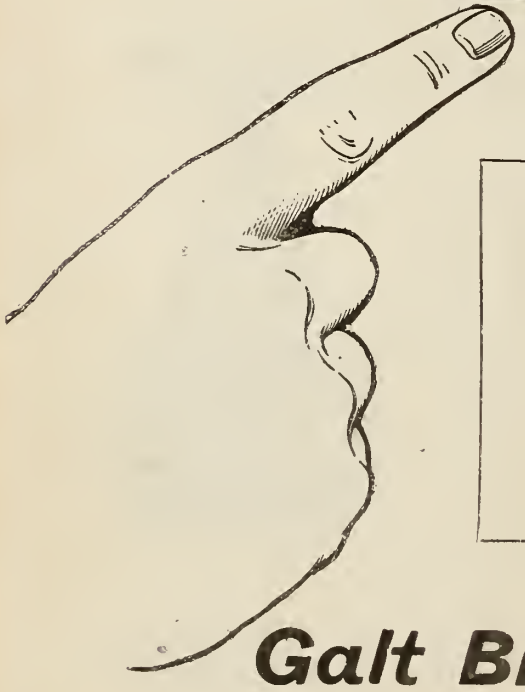
BRASS GATE

THE KERR ENGINE COMPANY, LIMITED
WALKERVILLE, ONTARIO

Registered **PERFECTO** Trade Mark

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, JUNE 15, 1917 | No. 12

EMPIRE BIBBS

LOOK these KITCHENER Faucets over closely. Note their simplicity. A half turn of the faucet turns on a full stream. QUICK IN ACTION AND EASY TO OPERATE. In these you see the most advanced ideas in bibbs in existence for the KITCHEN, SLOP SINK and LAUNDRY. A BIG, SMOOTH, SOLID STREAM COMES FROM THESE FAUCETS. NO SPREADING AND SPATTERING.



A237—"Kitchener" packless, quick-opening Bibb, swan neck, China handle.

A238—"Kitchener" packless, quick-opening Bibb, straight neck, China handle.

FILE COPY

EMPIRE BIBBS are made of FULL WEIGHT RED METAL—Solid, strong, made to stand up under strain of the severest kind of service. They represent **QUALITY**.

Empire bibbs are standardized. There is big business in sight for the dealer who lays in a stock of parts.

EMPIRE MANUFACTURING COMPANY
Limited

LONDON *TORONTO*

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

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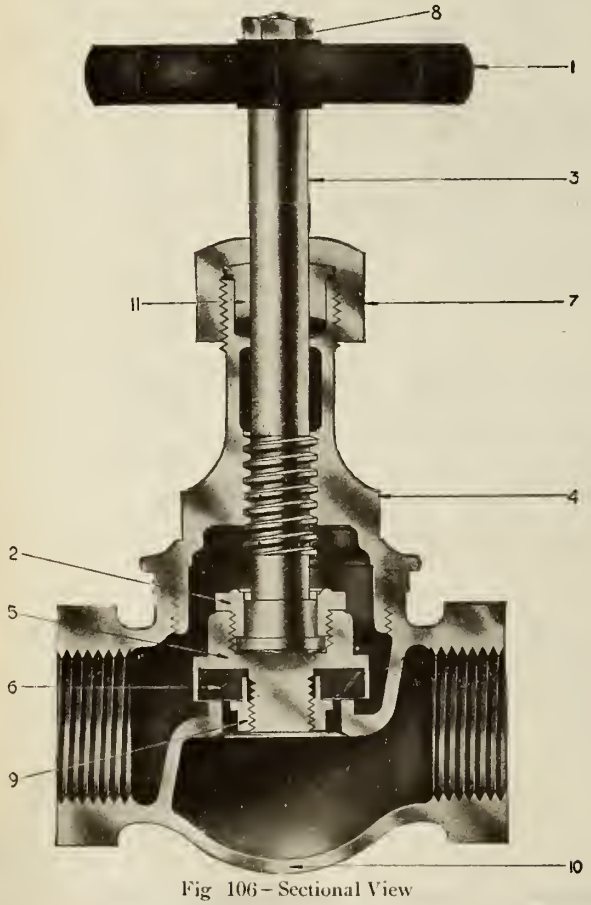


Fig 106 – Sectional View

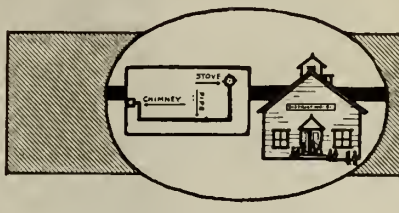
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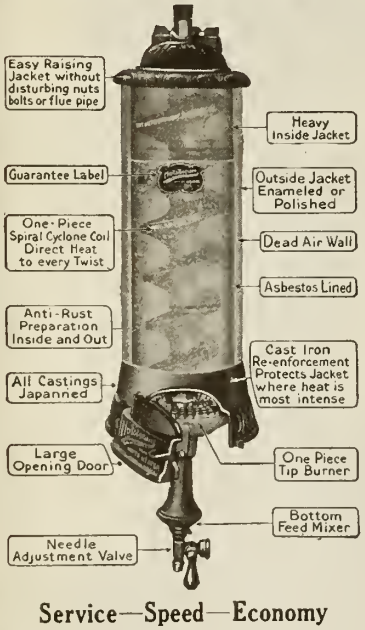
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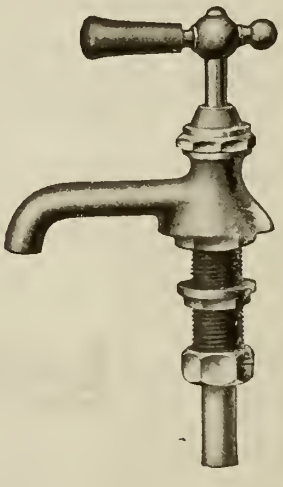
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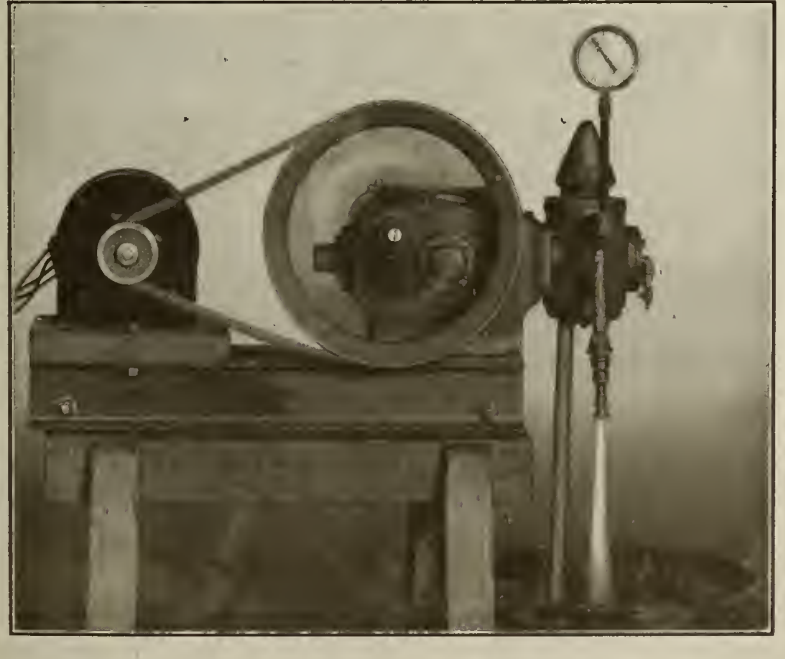
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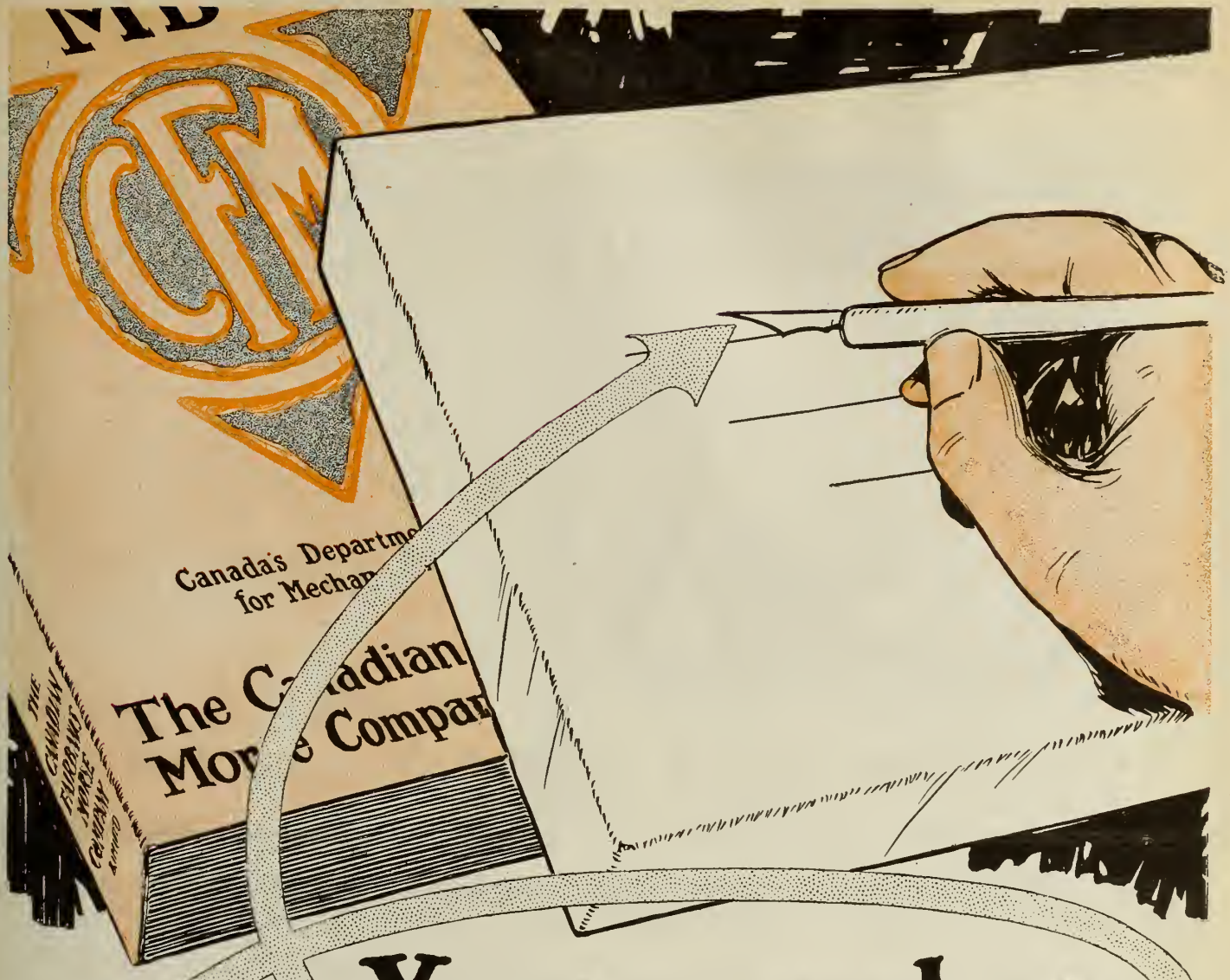
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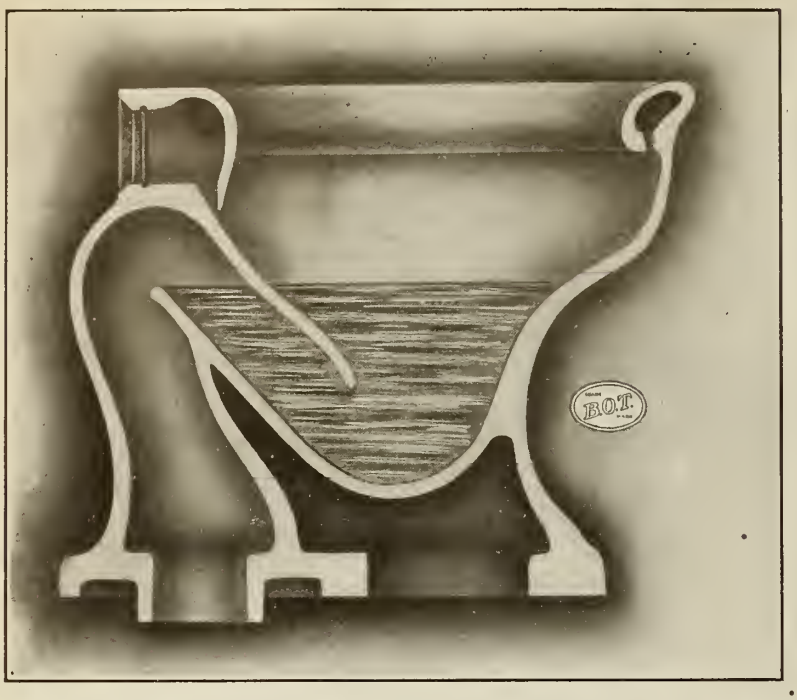
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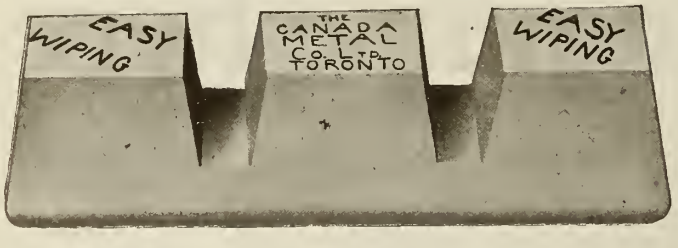
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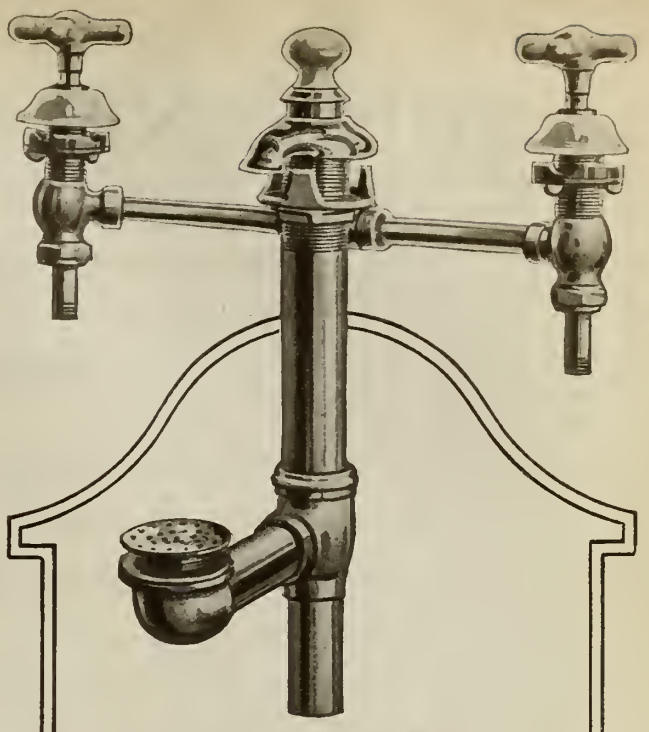
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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, JUNE 15, 1917 No. 12

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EDITORIALS

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THE SANITARY ENGINEER

VOL. XI JUNE 15, 1917 No. 12

Clay Tile Pipe vs. Cast Iron Soil Pipe

No Expense Should be Spared to Safeguard the Health of the Occupants of a Building—Experience Proves That Tile Pipe is Not the Most Desirable Kind to Use—Drain Diggers and Incompetent Men Only, Advise Its Use—While Actual Practice Proves Otherwise—The Public are More Interested in Safety Than Cents

WE are pleased to be able to report to our readers that their own and our efforts combined have not been in vain so far, and that we have more victories in view.

We are informed that finally the council of Burlington, Ontario, have decided in favor of cast iron soil pipe for house drains. Cast iron pipe must be run from the roof terminal to several feet outside the walls. The council, we are informed, expressed great satisfaction at the way the SANITARY ENGINEER assisted them in finally coming to a satisfactory, safe, and practical decision.

The town of Oakville, too, is now to adopt cast iron pipe for all house drains. The city of Windsor have changed back from clay tile to cast iron. It will be noted that Windsor had, after using cast iron for over 16 years, changed to clay tile. After a few months, however, the plumbing inspector is now demanding cast iron pipe. This, we feel, is a step in the right direction. A certain clay tile pipe manufacturer has taken some exception to the way we are voicing our opinion, and feels that we are injuring his business to some extent.

That may be so, but a trade paper that does not know the true facts and conditions, and that does not care to be brought into a controversy, is not justified in its existence. There is always one right way and our experience, and the experience of our readers, leads us to take the stand for right.

If the clay tile industry is depending for its success upon that portion of business which it gets from selling clay tile pipe for use under dwellings and buildings in which humanity spends so much of its time, then that industry has no right to exist. But we know such is not the case; we know that if the clay tile or clay products industry will seek newer fields, instead of hankering after a field in which the products have lost their usefulness and safety, that industry will flourish even more than it is doing today.

The following are a few more opinions from some of our readers, and it will be noted that every argument yet used in favor of cast iron, has been based upon the safety and lasting service to the public.

The SANITARY ENGINEER maintains that it should preach a gospel that will benefit the public first and last, knowing full well that by so doing, the customers of our readers will be better served and be better pleased with the results of the sanitary and heating engineer's accomplishments.



Victoria Museum, Ottawa. All drains are of cast iron soil pipe.

* * *

Editor SANITARY ENGINEER, Toronto, Ont.:—

Yours of the 20th inst. received, regarding the question of tile pipe as against cast iron pipe for drains under dwellings and buildings.

In this enlightened (?) age it is hard to understand why such a question should arise, for although the tile pipe drain has a few minor advantages (such as a smoother surface and the cost is less) over the cast iron drain, the obvious advantages of the latter are so great that no argument is left, it seems to me.

The whole matter resolves itself into a question of Health versus Cost, and we have passed the day when human life, or even health and happiness can be measured in dollars and cents. I have had twenty-five years' experience in this kind of work, and I have seen many tile drains removed after several years' use, the pipes being cracked and broken and the cement joints leaking like a sieve.

Even in the older countries, where

changes are not so readily made, the advantages of cast iron pipe have been recognized, and about twenty-five years ago in Glasgow, Scotland, a by-law was passed, and is still in existence, whereby only cast iron pipe is allowed under buildings, and the same conditions exist in all the progressive cities, both on this and on the other side of the Atlantic.

Winnipeg since 1899, when the first plumbing by-law was enacted, has never allowed any other material to be used under buildings, but cast iron piping, and in 1910, when the plumbing by-laws were revised, it was further stipulated that the cast iron drain should extend "not less than 8 ft. beyond the wall of the building" before being connected to a tile pipe, instead of as formerly 3 feet.

I trust this information is all that you require, and I shall be glad to give you any further information at my disposal.

Yours very truly,

(Signed) JOHN SMITH,
Chief Plumbing and Sewer Inspector,
Winnipeg.

The drainage of a building involves the use of material which will afford the greatest securities against the discharge of obnoxious gases that ultimately reduces the resisting powers of the physical constitution of people who have to occupy the building. Moreover, it is a fundamental function of public authorities to adopt such measures as will afford the necessary safeguards against every preventable disease, and in this connection the question of cost should have quite a secondary consideration. The use of clay tile pipes under dwellings, means the use of material that is brittle, easily damaged, difficult to detect flaws, and is limited in its ability to withstand internal pressure. Cast iron pipes, on the other hand, are stronger, will carry a greater pressure both internally and externally. It is less liable to defects and can be tested more severely. Clay pipes require to be jointed with cement which may or may not be effectively done, and will be liable to displacement during construction, until the cement sets. Cast iron pipes have much fewer joints to make and the jointing material of lead, sulphur or rust will be rigid and much less easily disturbed.

The clay pipes may of course be surrounded with concrete, say, 6 inches thick, but concrete of the usual quality is not air tight, nor water tight, and consequently simply adds strength to the pipes without materially increasing its gas tightness. It is possible to make concrete both water and gas tight if the builder adopts the proper means and is willing to incur the expense. It is therefore questionable if clay pipes laid in, and surrounded with concrete is then cheaper than cast iron pipe.

The sanitary authorities must acknowledge that the primordial requirements of drains under buildings should be beyond suspicion or to effective protection against the risks of contamination of the soil due to defects and leakage, and the danger of sickness caused by the emanation of sewage gases. With all care, drains are subject to rough usages. Things are discharged and sooner or later a block occurs, causing an internal pressure and if there are defects, then evils are caused without the inhabitants' knowledge, until the conditions are such that the olfactory organs cannot help noticing there is something wrong. Meanwhile the vitality of the occupants deteriorates and disease may be contracted. What, then, is the position of the people? They elect representatives to make laws and regulations which are for their protection, and if the sanitary authorities neglect to establish satisfactory rules, and see they are observed, then the supposed protection is a delusion.

Public health requires public spirit, which counts not on the saving of a few dollars, but on the saving of lives.



City Hall, Toronto, and Parliament Buildings, Toronto. Both are equipped with a cast iron drainage system.

A SPLENDID NEW BOOK

One of the most recent books published, that will no doubt be of interest to sanitary engineers, is "The Modern Factory," by Geo. M. Price. It deals with every possible detail concerning the safety of the worker from accidents, and also deals with the question of comforts. It takes up the matter of pure drinking water, the best methods adopted to furnish water at convenient places in the factory, sanitary showers, sanitary w.c.'s and other fixtures of like nature, not only from a sanitary standpoint, but as a benefit to workers in time-saving, creating greater efficiency in the whole factory, ventilation, dust-collecting devices and fan systems for taking off all manner of injurious gases.

The main feature of the book is that proofs are given where savings have been effected, all such evidence constituting splendid selling arguments that can be used by sanitary engineers, when business is being canvassed for.

Full particulars about this book may be procured from the book department, Maclean Publishing Co., 143-153 University Ave., Toronto.

In this connection it might not be out of place to give a few items regarding factory sanitation in and around Toronto, which figures were obtained from the Toronto Health Department recently. Such figures prove that factory sanitation will be a splendid field for business if the sanitary and heating engineer will cater in a businesslike manner for such patronage.

Oshawa, Ont.—The tender of Vermehr Engineering Company, Toronto, for the construction of a filtering plant, has been accepted, subject to approval of the Provincial Board of Health.

New Canadian Patents

No. 174,680.

The H. Mueller Manufacturing Company, assignee of Arthur W. Cash, both of Decatur, Illinois, U.S.A., 23rd January, 1917; 6 years. Filed 25th June, 1915. Receipt No. 253,262.

Claim.—1. In a tapping machine, the combination with a frame, a cutter shaft, and means associated with the shaft for causing the longitudinal movement of the same, of driving means for rotating said shaft and movable therewith, said driving means comprising a gear fixed to the shaft, a driving gear meshing with said fixed gear, and a casing enclosing said gears movable with said shaft and guided in its movement by said frame.

2. In a tapping machine, the combination with a cutter shaft, a frame having side bars or standards, and a feed screw associated with said cutter shaft for causing the longitudinal movement of the same, of driving means upon said cutter shaft and movable therewith, and a casing about said driving means having apertured eyes through which said side bars or standards pass whereby said casing is guided.

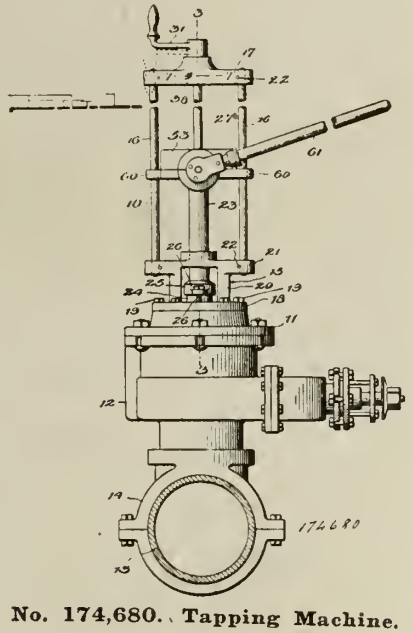
3. In a tapping machine, the combination with a frame, a cutter shaft having upon its end a cutter, and means associated with the cutter shaft for advancing or withdrawing the cutter to and from the main, of driving means carried by said shaft and movable therewith, said driving means comprising a gear fixed to the shaft, and a driving gear meshing with said fixed gear, a handle for rotating said driving gear, said casing being adapted to form a receptacle for a suitable lubricant for said driving means.

4. In a tapping machine, a frame comprising a feed screw yoke, a cast iron body, and a pair of standards connecting said yoke and said body, a cutter shaft passing through said cast iron body and having a cutter upon its end, a feed screw passing through said feed screw yoke and having its inner end in threaded engagement with the outer end of said cutter shaft, driving means secured upon the outer end of said cutter shaft, and a casing enclosing said driving means and embracing said side bars.

5. In a tapping machine, a frame, a hollow cutter shaft having notches in its inner end, means for rotating said cutter shaft, means for causing the longitudinal movement of said cutter shaft, and an arbour having a central bore for the reception of a pilot drill and having a screw threaded portion adapted to engage the complemental screw-threaded portion of a cutter, said arbour also having lugs corresponding in shape to the notches in the inner ends of said cutter shaft and adapted to engage therein.

6. In combination, a shaft, a feed member associated with said shaft, and friction means disposed at an angle to a line passing through the axis of rotation of said feed member and adapted to bear against said feed member to retard the movement thereof relative to said shaft.

7. In combination, a shaft, a feed member associated with said shaft, a stationary member engaging said feed member and having a bore extending at an angle to the radius of said feed



No. 174,680. Tapping Machine.

member, and adjustable means disposed in said bore and frictionally engaging said feed member to retard the movement of the same relative to said shaft.

8. In combination, a rotary member, a rotary feed member associated therewith, a stationary supporting member for said feed member, a bore in said supporting member extending at an angle to the radius of said feed member, a plug in said bore adapted to bear against said feed member, and means in the bore for forcing said plug yieldingly against said feed member to retard the rotary movement of the feed member imparted to it by the rotary movement of said shaft.

9. In a tapping machine, a frame having a yoke provided with a central bore and a side bore extending at an angle to the radius of said central bore, a cutter shaft, a cutter on said shaft, a feed screw in the central bore of said yoke, and in threaded engagement with said cutter shaft, means for manually rotating said feed screw to move the cutter shaft longitudinally, means for rotating said cutter shaft, a friction plug in said bore adapted to bear against said feed screw, and means in the bore for forcing said friction plug yieldingly against said feed screw whereby the rotary movement of the feed screw imparted to it by the rotary movement of the cutter shaft is retarded.

10. In a tapping machine, the combination with a cutter shaft, and means for causing the longitudinal movement of said shaft, of driving means for rotating the shaft and mounted thereon so as to be longitudinally movable therewith, a frame having side bars, and a casing enclosing said driving means, longitudinally movable standards with said shaft and slidably engaging said standards whereby the casing is guided.

11. In a tapping machine, a frame, a cutter shaft, a feed screw associated with said cutter shaft for causing the longitudinal movement of the same, driving means upon the cutter shaft for rotating the same, a detachable handle on said feed screw for rotating said feed screw to move the cutter shaft longitudinally, said handle being adapted to be reversed for engagement with the frame to hold the feed screw stationary and cause the longitudinal movement of the cutter shaft when the latter is rotated.

No. 174,805.

The Canadian Westinghouse Company, Limited, Hamilton, Ontario, Canada, assignee of the W. S. Hadawny, Jr.. New Rochelle, New York, and of Edward E. Rose, Swissvale, Pennsylvania, both in the U.S.A., 30th January, 1917; 6 years. Filed 15th Janu,-ary, 1913. Receipt No. 219,220.

Claim. — 1. An electrically heated boiler comprising a fluid containing vessel, and a heating element consisting of a plurality of resistence units, the ends of which are received in a single pair of oppositely disposed terminal devices.

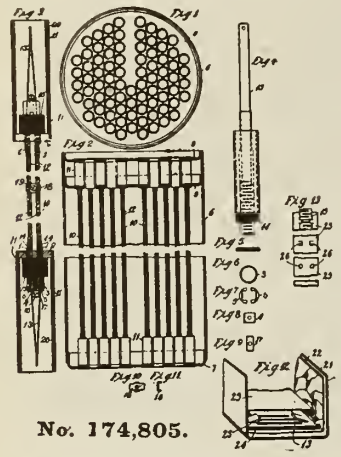
2. An electrically heated boiler comprising a fluid containing tank, and a plurality of flattened tubular units, the ends of which are received in a single pair of terminal devices.

3. An electrically heated boiler comprising a fluid containing tank, and a plurality of heating units extending through the tank from end to end, and severally comprising insulated resistance elements, metal sheaths or casings for said resistance elements, and short metal tubes in which said sheaths or casings are sealed.

4. An electrically heated boiler comprising a fluid containing tank, and a

plurality of heating units extending through the tank from end to end and comprising relatively short end tubes which are headed into the ends of the tank, interposed flattened metal tubes that are sealed into the short tubes, and insulated resistance units disposed within the flattened tubes.

5. An electrically heated boiler comprising a fluid containing tank, and a plurality of heating units extending through the tank from end to end, and comprising relatively short end tubes headed into the ends of the tank and provided with insulating linings, interposed flattened metal tubes sealed into the short tubes, and resistance units disposed within the flattened tubes and separated therefrom by heat resisting insulation.



No. 174,805.

Electrical Heating Boiler.

6. An electrically heated boiler comprising a fluid containing tank, and a plurality of heating units extending through the tank from end to end and comprising relatively short end tubes headed into the ends of the tank and provided with insulating linings, interposed flattened metal tubes sealed into the short tubes, and resistance ribbons located within the flattened tubes and separated therefrom by insulation partially composed of clear mica.

7. An electrically heated boiler comprising a fluid containing tank and a plurality of heating units extending through the tank from end to end and comprising relatively short end tubes headed into the ends of the tank and provided with insulating linings, interposed flattened metal tubes sealed into the short tubes, and resistance ribbons having a plurality of slots cut alternately in opposite edges to provide a zigzag path for electric current, said ribbons being located within the flattened tubes and separated therefrom by insulation composed of an inner layer of clear mica and the outer layer of covering of moulded mica insulation.

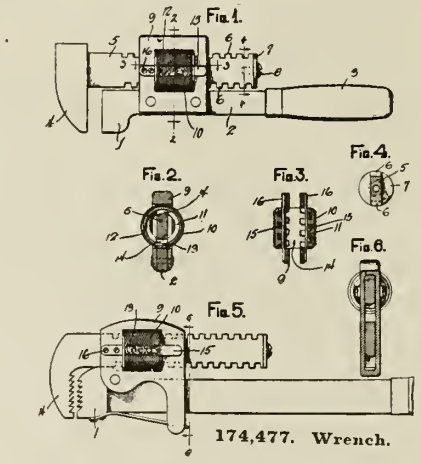
No. 174,477.

Julius C. Fjerdingstad, Los Angeles, California, U.S.A., 16th January, 1917; 6 years. Filed 23rd November, 1916. Receipt No. 272,352.

Claim.—1. In a wrench, the combination with a pair of jaws one moveable and the other stationary, said stationary jaw having a shank provided with a handle, said moveable jaw having its shank provided with threads, a housing secured to the shank of said stationary jaw and provided with openings in its sides, a nut arranged in said housing and provided with interior threads, said threads having oppositely arranged cut-out portions whereby the threads of said nut may be disengaged from the threads of said shank, and means fastened to the casing for frictional engagement with the interior of said nut for holding said nut in opened position.

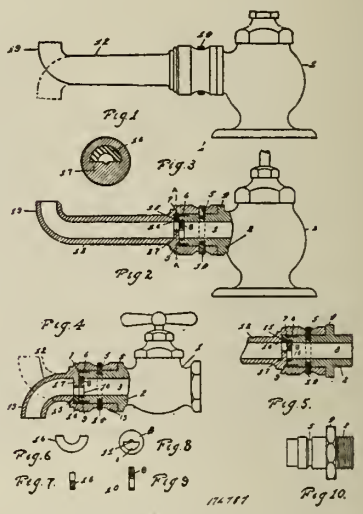
2. In a wrench, the combination with a pair of jaws one movable and the other stationary, said stationary jaw having a shank provided with a handle, said moveable jaw having its shank provided with threads, a housing secured to the shank of said stationary jaw and provided with openings in its sides, a nut arranged in said housing and provided with interior threads, said threads having oppositely arranged cut-out portions whereby the threads of said nut may be disengaged from the threads of said shank, spring elements having one end secured to said housing and extending across the opening in said housing and through the threaded opening of said nut for frictionally engaging the threads of said nut.

3. In a wrench, the combination of a pair of jaws, one stationary and the other moveable, said moveable jaw provided with screw threads, a housing secured to said stationary jaw and having openings in its sides, a nut screw threaded mounted upon the screw threads of said stationary jaw and having oppositely arranged cut-out portions on its interior, spring elements secured to said housing and extended through said nut frictionally engaging the threads of said nut when said moveable jaw is in open position and adapted to engage the said recesses on the interior of said nut when said moveable jaw is locked in position, and means mounted upon the outside of the nut for determining the position of the threads on the interior of said nut.



174,477. Wrench.

4. In a wrench, the combination of a pair of jaws, one moveable and the other stationary, the shank of said stationary jaw carrying a housing, the shank of said moveable jaw provided with threads and extending longitudinally through said housing adjacent one edge thereof, said springs extending through said nut and across the openings in the side of nut and adapted to register with recesses provided in the threads or said nut when said nut is turned to locked position.



No. 174,787. Tap.

No. 174,787.

Harry Albert Zeigerman, Toronto, Ontario, Canada, 30th January, 1917; 6 years. Filed 30th September, 1916. Receipt No. 270,346.

Claim:—The combination with a base having a stem projecting outwardly therefrom, and a valve seat in the outer end or said stem, of a valve mounted in said seat and having one of its sides of solid formation and closing nearly one half of the passage through said stem, and a faucet having an enlarged inner end extending over said stem and its outer end bent at substantially right angles and having in the interior thereof adjacent to said valve a solid portion integral therewith and closing nearly one half of the opening therethrough, said solid portion, when the faucet is rotated with its curved end downwards, coming into parallel engagement with the solid portion of the said valve and forming an enlarged opening therebelow, and when the faucet is rotated with its curved end upwardly registering with the opening in said valve and restricting the flow of liquid therefrom, a valve seat in said faucet disposed oppositely to said solid portion, and a valve in said seat.

Winnipeg, Man.—S. Koffman has been registered proprietress of Winnipeg Plumbing & Electric Company.

THE MACLEAN PUBLISHING COMPANY, LIMITED JOHN BAYNE MACLEAN, PRESIDENT
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THE SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

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143-153 UNIVERSITY AVENUE,
TORONTO, CANADA.

WHAT IS YOUR OPINION ?

Dear Sir--

For a number of years the question of using a main house trap and breather on each private branch drain from a dwelling or building, between a house drain and the main sewer, has been under consideration. Many favor the main house trap and breather, while some favor dispensing with both.

The following are a number of questions relating to the subject, answers to which will be greatly appreciated, and if time will permit, a rough sketch will also be welcomed.

1. Are you in favor of the use of a main house trap and breather ? If so, why ? .....

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2. Are you in favor of dispensing with the main house trap and breather ? If so, why ? .....

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3. What is the law regarding above subject in your locality ? .....

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Signed.....

Address.....

We have mailed a number of copies of the above to some of our readers and are receiving a splendid response. We want every reader to record his opinion as soon as possible.

Tear out when duly filled out as requested and mail by return to " The Editor."

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 23

ROOFS FOR SEWAGE TANKS

"WHY does a miller wear a white cap?" is an old riddle. When one mentally casts about to find an answer that would explain why the cap was white, he would be eventually informed that it was to cover the miller's head, no particular reference being made to the color of the cap, therein lying the catch. So it is with roofs for sewage tanks. If one seeks to find some special bacteriological or chemical reason why a roof is necessary, he will find himself on the wrong track. The roof performs, in the main, the function of any ordinary roof of a tank or cistern. There are consequently conditions under which a roof for a septic tank (generally advisable) is not necessary. The old superstition that a septic tank must have an air-tight covering has with many other popular fallacies relating to septic tanks been proved untrue. But like many superstitions it still sticks and is occasionally laid down as a fundamental necessity of successful action in small sewage disposal plants. As a matter of fact the scum that forms on the top of a septic tank is the best air-tight covering that could be devised. But should air get into the sewage in a septic tank the result would not be harmful. As now understood the old septic tank is best replaced by a settling tank merely where the solids fall to the bottom and can be cleaned out occasionally. Whether the bulk of sludge is slightly increased by an interruption of the septic action, which ordinarily destroys some of the solids, is not particularly important as in such a case the presence of air will help to oxidize the sewage, thus aiding that which would in any event have to be done later before the sewage is purified.

Not only is an air-tight covering not necessary but a covering that is air-tight is highly undesirable. It has been shown in previous articles of this course that under the chemical and bacterial conditions obtaining in a septic tank, many gases are formed such as carbon dioxide, nitrogen, etc., and sometimes small quantities of hydrogen sulphide which is an evil smelling gas. These gases form from 1 to 8 per cent .of the volume of sewage treated and may represent an amount of one-half a cubic foot per day per person contributing to the septic tank. About 60 per cent. by volume of such gases is inflammable, the inflammable gases being principally hydrogen and marsh gas. In large plants, under conditions similar to the septic tank, these gases so formed, are actually used for lighting purposes. On some occasions serious explosions have occurred due to the inflammable gases in septic tanks being accidentally ignited. It cannot, therefore, be too strongly emphasised that such tanks should be well ventilated and not made "air-tight."

Col. Geo. E. Waring, Jr. one of the early sanitarians of the United States was prominent in all sanitary reforms. He it was who advocated omitting the seat cover in a water closet as being unnecessary and its addition insanitary. In every way he tried to make the public sense the importance of sanitation and to banish false modesty. He went so far as to advocate, where the climate permitted, septic or settling tanks uncovered or with only a screen, the sides of which were to be constructed of white glazed tile to be kept cleaned. But there may be odors due to the gas hydrogen sulphite likely to be formed in septic tanks and a cover which allows the tank to be properly ventilated though the house vent stack is desirable. In Canada of course climatic, as well as other, conditions demand a cover for small sewage tanks.

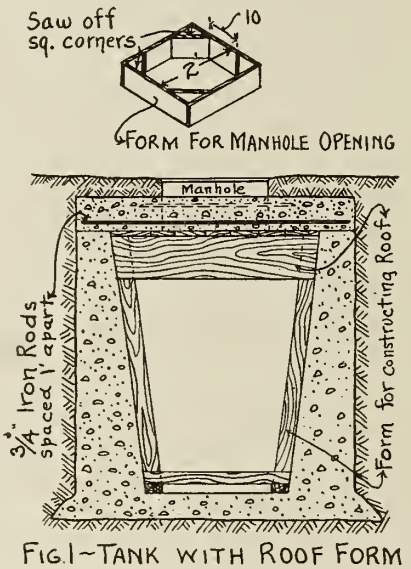


FIG. 1—TANK WITH ROOF FORM

Roofs for sewage tanks have been constructed of brick arches and also of planks. The making of forms for brick arches, however, presents difficulties and, further, brick roofs are liable to be affected sooner or later by frost action. A wooden roof of two inch planks is a satisfactory and easily constructed temporary covering. But for permanence, concrete makes the most satisfactory roof. As the construction of concrete roofs presents some difficulties several suggestions will be given from which the reader should be able to find something suitable for his particular needs.

1.—From "Practical Methods of Sewage Disposal."

A section of a tank with a concrete roof is shown by Fig. 1, together with the temporary form built up inside the tank on which to lay the roof. The form is built by setting 2-inch by 4-inch scantling on wedges along the walls of the tank in pairs 18 inches apart and bracing these at the foot. Boards 1½ inches thick and 10 inches wide are then nailed across the tank on the top of the scantling, the top edges of the boards being one inch below the top of the walls. A false roof is then made out of boards nailed lengthwise of the tank to the 10-inch boards and a layer of concrete 2 inches thick is then placed on the floor thus made, reaching over the top of the walls to the outside edges. Iron rods ¾ of an inch thick and spaced 1 foot apart are then placed on the concrete across the tank and reaching to within 1 inch of the outside edges of the wall. More concrete is then placed over the first layer to a total depth of 6 inches or 8 inches, depending on the width of the tank, the concrete being well rammed as it is placed. After the concrete has set, the wedges may be knocked from under the upright scantling and the form taken down and removed through the manhole.

To provide manholes or openings through the roof into the tank and into the syphon chamber, round openings 2 feet in diameter should be cut in the false roof while it is being laid, the distance between the pairs of scantling at this point being made 2 feet. The manhole frames should then be so placed that the flange or base of the frame will be imbedded to the depth of 2 ins. in the roof when completed. The manhole at the entrance end of the tank should be located at one side of the entrance pipe and over the valve on the sludge pipe. To provide necessary opening through the concrete roof below the

manhole frame, an eight-sided wooden form as shown in Fig. 1 with an inner diameter of 2 feet and a height equal to 2½ inches less than the thickness of the roof is placed over the opening in the false roof. On this wooden form the manhole frame is placed and the concrete laid around the form and over the flanges of the manhole frame. Two of the ¾ inch iron rods should be placed across the tank close to each side of the wooden form after the first 2 inch layer of the concrete roof has been placed.

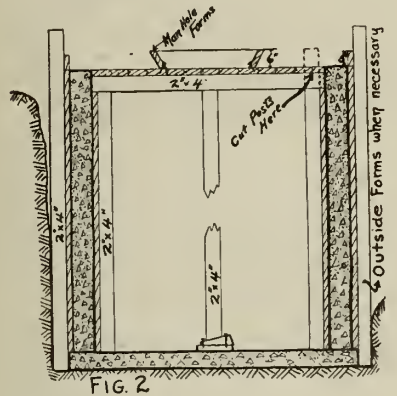


FIG. 2

When it is desired to carry the manhole some distance above to the level of the top of the roof to provide for a rather deep earth covering for the tank, the eight-sided wooden form may be made deeper as desired, and another larger similar form built for the outside form of the necessary concrete manhole well. The space between the two forms may then be filled with concrete and the manhole frame set on the octagonal shaped wall thus formed.

2. With cast iron so expensive, it becomes almost necessary to make manhole covers of concrete itself rather than using cast iron frames and covers or even cast iron covers alone as has sometimes been done.

If a manhole 18 inches square be left in the roof then a 24 inch square slab of concrete 4 inches thick would make a cover of about 200 lbs. in weight,—much heavier to handle than an ordinary cast iron cover but much cheaper. Such a cover can be strengthened and prevented from crackinug by using small bars of iron or chicken wire netting as reinforcement.

3. With but little extra trouble concrete manhole covers can be made to fit flush with the top of the tank as described in the following method which also shows how the roof of a large wide tank may be constructed.

After the concrete for the side walls has been brought to the proper height, place a 5-inch board above it, and nail to the posts of the outside forms (See Fig. 2). In case no outside forms are used, this board can be held in position by driving and bracing stakes 1 inch from the outside face of the tank wall.

Saw or cut off the posts of the inside forms 6 inches below the top of the concrete, and nail 2x4 inch joists to the top of these. Then place a 2-inch board or two 1-inch boards on the concrete in the bottom of the tank, and on this place a row of posts under each 2x4, to support them in the middle. If these posts are not cut the exact length, they can be raised into place by wedging between the board on the bottom and the lower end of the post. These posts can be either 2x4 or 3x4 lumber. Toe nail the bottom to the posts, and fasten the top by nailing through the 2x4 from the upper side. Now cover the top of the tank inside the walls with 1-inch boards. There is no reason for using surfaced stuff, but the boards should fit tightly together. In case cracks are left between after placing, they can be filled by smearing a little clay in them.

Next, place a box, as shown in Fig. 3, with sloping sides, the large end being placed up, and fasten securely to the boards covering the tank. This is to provide for a manhole in the top of the tank. The sides of the box should be 6 inches above these boards. You are now ready to place concrete. The thickness of the concrete should be 6 inches in the middle, sloping to 5 inches on the edges, and you have already a gauge for this thickness in the heights of the side forms and of the box in the middle. Place 2 inches of concrete over the entire form, then put a sheet of heavy chicken wire, coming to within 3 inches of all edges, and place the rest of the concrete, making it come

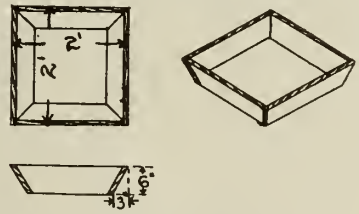


FIG. 3 – Manhole Form

6 inches in the centre (to the top of the form for the manhole), and 5 inches at the edges (to the top of the form around the inside). The concrete should not be too wet and should be tamped until water flushes to the surface. Finish the top by troweling or with a rough float.

The manhole cover is now to be made. After the concrete in the tank roof has hardened for two or three days, remove the form around the manhole. As it is only necessary to make the manhole cover 3 to 4 inches thick, place a false bottom of boards in the hole, so that the top comes either 3 or 4 inches below the concrete sides. Place the lifting ring—an old bridle bit or a hitching post ring can be made to serve—in position by boring a hole in this false bottom large enough to take the nut, allowing the washer to lie on top (see Fig. 4). If these just about fit, the stay bolt and ring need no other support. Put cardboard, heavy building or tar paper against the edges of the concrete adready exposed, and fill the hole with concrete even with the roof already in place.

After 1½ inches of concrete has been placed, lay in a square of chicken wire, large enough to come within 1 inch of the edge. To do this cut a hole through it to allow the lifting ring to pass through. Then complete the concreting, bringing same to an elevation even

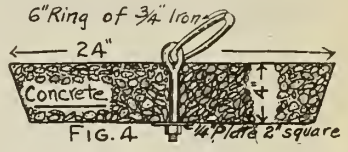


FIG. 4

with the top of the concrete already finished. As the cover will weigh about 150 pounds, the ring should best be large enough to allow both hands to grasp it. After the concrete has set one week, the cover can be removed by means of the ring. In case it sticks, it can easily be pried up by a lever through the ring, using a block on the finished concrete top as a heel.

When the roof is two weeks old, remove the manhole cover, bore a hole in the wooden floor, saw an opening, descend and loosen the roof form, passing it out through the manhole.

TAKING OVER SANITARY AND HEATING ENGINEERING DEPARTMENT

J. N. McGregor, hardwareman, Oakville, conducted for many years a successful Sanitary and Heating department in connection with his regular hardware business. It has grown to such an extent that it required special and undivided attention. George W. Barrett, who has charge of it, has now taken that branch over entirely and will now conduct it on his own behalf. Mr. Barrett is a practical man, is a firm believer in modern methods being adopted, and that no goods are too good for use in the sanitary and heating profession.

The SANITARY ENGINEER joins the many friends of Mr. Barrett in wishing him every success

ENLARGE AREA FOR COMPULSORY SEWER CONNECTIONS

At a recent meeting of the St. Catharines City Council, a motion was made by the Medical Health Officer requesting the Council to pass a by-law placing within the area for prohibited outside closets, all the streets now sewered and which were especially exempted in a previous by-law. The motion, which was carried, was brought in owing to the prevailing opinion that a recent smallpox case was due to an outside closet.

THE SANITARY ENGINEER

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JUNE 15, 1917

WRONG TO RIGHT FROM WITHIN

EVERY trade, every calling and every country has its own peculiar troubles. Troubles that often appear to be brought about by the "Man on the outside." But is that a fact, or is it imaginary? We say in the sanitary and heating engineering trade that, the curbstone plumber, who poses as a practical man, is an evil to us, as well as to every one who patronizes him. We moan and groan about the unfair treatment meted out to us by the manufacturer and supply men; because we know, or assume to know that he will and does "sell to everybody at wholesale prices, etc., etc." We point at So-and-So, who failed in business and paid so much on the $, started again and cut prices all to pieces, and we go on ever complaining at every form, human and otherwise, that is on the outside. But are we right? Who permitted these evils in the first place?

Ourselves and no one else, who was responsible for this war? Every man on earth had a hand in the preparation for this war. We practised too much the law of the survival of the fittest, the law of supply and demand, and let it go at that. We were, and are to-day ever on the lookout for a remedy to all our troubles, from a source outside of ourselves. But are we not erring in so doing?

We need to look to matters on the inside, conduct a series of "self-examinations" and mend our own ways first. But first of all we are to convince ourselves, each one of us in the trade, that our own enemy is on the inside.

The following quotation by Sir Arthur Ponsonby, M.P., is very much to the point, and in a way has very much to do with conditions that irrrtate in every calling.

WHY NOT?

"The real enemy is established inside every country. It is the spirit of tyranny, greed, materialism, intolerance and militarism. It is the unfair distribution of wealth, the neglect of education, the idolization of riches. The victims of that enemy are to be found in the slums, in workhouses, in asylums and in prisons. Why not make ready to fight that enemy instead of wasting life and treasure in the slaughtering of men who are just as anxious as you are to turn their attention to the real evils that surround them?"

To those who cannot go to the front, those who must keep the wheels of our industries going and furnish the needs of non-combatants, there is a great work to perform. Commercial and industrial evils should be righted, and without doubt a little self-examination, and righting the wrongs we find, will go a long way toward eliminating the evils we feel are caused by the "other fellow."

READ YOUR TRADE JOURNAL

IT IS not often that the publishers of class, or trade journals are among that group of men that can be bought and sold for pence. They and their staffs have to be the very leaders to the class they cater to. Information has to be specially procured that could not be used except by men who read their trade paper. Yet how many are there who, after reading over the advertisements, very seldom look at the articles contained in the reading matter?

Now, who is the loser, the publisher, or the reader? The latter, of course, and proof of this assertion can be found wherever we find an indifferent or easy going tradesmen. This does not only apply to our readers but to everyone.

The writer called upon a member of the trade a few weeks ago, and was told to cancel his subscription, because, said he, "you have boosted high-grade goods so much that a fellow can't get a cheap stop cock now. If things go on, Mr. Editor, the price of a plumbing job will be so high that there won't be any cheap jobs to be gotten."

During the conversation, our late subscriber said.

"I used to be able to "skin" a job once in a while but I can't now, because I can't get a piece of cheap brass goods."

Let us sincerely hope such is the case and THE SANITARY ENGINEER will never lose any sleep at the loss of such a subscriber. We want THE SANITARY ENGINEER to be a "business builder," and a builder of better class work. And if our subscribers will read THE SANITARY ENGINEER in as earnest a spirit as it is published, we shall soon see better days in store for every member of the trade.

CANADIAN MANUFACTURERS IN CONVENTION AT WINNIPEG

EVERY sanitary and heating engineer should take note of the proceedings of the Canadian Manufacturers' Association at their Convention now being held in Winnipeg. Col. Thos. Cantley, of New Glasgow, gave a splendid address and sounded a note of warning that should be heeded by every Canadian, whether in business or otherwise. Col. Cantley, as most of our readers know by this time, is one of those men who have made good, and his opinions are by no means narrow. But chief of all men in Canada who should particularly heed his warnings are the Canadian manufacturers themselves.

There is never a day passes that does not prove how very little true sentiment is being shown by 90 per cent. of them when they buy goods or employ experts, and this brings us to a portion of the executives' report which, among the many matters dealt with, condemned the employment of alien architects and engineers for Governmental work that could well be handled by Canadians. It was pointed out that aliens were seldom familiar with material produced in Canada and showed preference to the materials and specifications of their own country. Canadians should support Canadian institutions and the men who were trained therein.

Beautiful sentiments, but, if we were to mention every case where an alien architect, an alien civil engineer, an alien sanitary and heating engineer had been given preference by members of the Canadian Manufacturers' Association, we should fill a book much larger than this issue of the SANITARY ENGINEER, and even to-day there are thousands and thousands of dollars being sent out of the country that might just as well remain in it. Our Canadian manufacturers make all kinds of luxuries that we do not need, and the public are neglecting those things we do need, and buy them from other countries. The sanitary and heating business is no exception to the rule, though the amount of goods bought that can be procured in Canada is very small, except where alien architects specify such goods as are not made in Canada.

This would not be the case if every member of the Canadian Manufacturers' Association had studied Abraham Lincoln's preachments, and particularly that in which he said:

"I do not know very much about political economy, but this I do know that when we buy goods in a foreign country, we get the goods and the foreigner gets the money. But when we buy goods in our own country we get the goods and we get the money."

Canadian manufacturers do not follow this policy as closely as they should, and the members of the Canadian Manufacturers' Association are no more loyal to Canada than other members of the community. The writer could cite many cases of our most prominent flag flyers, and blustering patriots that even had the plumbing and heating installed by aliens and the material also supplied by them, and this in spite of the fact that goods of this kind can be procured just as cheaply and just as good right here in Canada. We like to hear patriotic sentiments expressed, but, after all, it is carrying out those sentiments in practice that counts in any country.

NO PLUMBERS IN CANADA

THE joke is on the Toronto *Daily News*, when they try to prove that "plumbers" have no right to the term "sanitary engineers."

There are no plumbers, strictly speaking, in Canada, and if the *News* knew as much about the profession as they should, the satirical article, entitled "A repentant plumber" would not have appeared. If there is one class of men who eat their own words and whose every day efforts are repenting to-day what they said or did the day before, that class are the newspaper writers. They waste time in jumping at rash conclusions, and then try to get away with their piffle the best they know how. We would like to know why "repentant plumbers"? A practical man has nothing to repent of. It is those cheap jacks that come into being as a result of a cheap jack public demand, to whom, alone, such a term could be applied. Ninety per cent. of our newspapers have kicked against examination of plumbers or sanitary engineers, but if every man working at the sanitary engineering profession were to be asked to pass an examination before procuring a license, there would be no men engaged in the trade that would cause the public to resent the charges of "a plumber."

The writer has been in the business for 25 years and never had a customer resent a bill for work done, and there are thousands of others in the trade that have had the same experience. If the *News* ever got "soaked" it was because they were after a cheap job and deserved all they got. *The News* should not forget that there are no millionaires in the sanitary and heating business. But there's lots among printers.

Steam Condensation Valuable--Why?

What it is and Why We Need it—Correct Methods of Handling and Utilizing Steam Condensation — Showing That to Allow Natural Law Full Sway, the Problems Confronted May Easily be Remedied.

By Wm. H. Rose, of R. E. Cleaton & Co., Engineers, Montreal and Toronto.

WE ARE all familiar with the phenomena of condensation, we can see it in various forms all around us. Condensation is seen on windows and walls, on cold pipe service, exposed to warm atmosphere, on our boiler plates when newly filled with cold water, in hot settings, and in many other instances.

Condensation is visible in these cases, in the form of dewy moisture, in a greater or less degree, clinging to the exposed surfaces of the cooler medium, or material affected, and it is directly proportional to the temperature difference.

The greater the temperature difference between the surfaces and the surrounding air the greater the amount of condensation, and conversely the less the difference, the less the amount of condensation.

Now this moisture comes from some source, in this case the surrounding air, and its presence is due to simple causes. and it is dependent on Natural Laws.

To enable us to properly understand what is meant by the term Condensation, we must begin by understanding these Natural Laws, and we will merely deal with those which affect the matter in hand, "Steam Condensation." We will divide our inquiry into two steps. In the first step we will deal with the turning of a solid into a liquid, and a liquid into a gas. In the second, we will simply reverse the procedure, turning the gas back into the liquid, and the liquid into the solid.

We thus perform the operations of Liquefaction—Vaporization—Condensation—and Solidification, and each and every step requires the use of heat, either applied to or abstracted from the solid gas or liquid. These steps are essential to the proper understanding of our subject.

It is also necessary, in this study of Condensation, to clearly understand the meaning of the following terms: Sensible Heat, Latent Heat, Total Heat, and British Thermal Unit, commonly expressed as B.T.U.

Sensible Heat, as the words denote, represents the amount of heat which we can feel present, in raising, say, water from a cool state to a hotter state, and also in raising the temperature of the air we breathe. This heat we can feel through our senses, and can also measure and record it with a thermometer.

Latent Heat is also denoted by the words, but it is not so clearly understood by the majority of us. If instead of Latent Heat we used the words "Hidden" Heat, perhaps we can more readily understand, for this heat is hidden away in our gases, or our solids. It is hidden, in so far as our senses are concerned. We cannot feel it, nor can any thermometer show it directly, but we know it is present, as we can chase it out, or call it forth from its hiding place, when we can then determine its amount.

Total Heat, as the words denote, is the total heat in Steam, Water, or Ice, and represents in B.T.U.'s the Latent Heat and Sensible Heat combined.

The B.T.U. is the standard of heat measurements adopted in Great Britain and America, and is used in conjunction with one of the most universal elements we have around us, water, and water is the standard for Specific Heat, being "1," and all others materials are based on this standard, either greater or less according to their natures.

The B.T.U. represents a unit of heat, and its effect on a unit of water, the unit of water being one pound weight, and the effect of this unit of heat on the pound of water is to raise its temperature through one degree F. Therefore the B.T.U. is the amount of heat necessary to raise one pound of water one degree in temperature."

It is necessary to thoroughly understand what this term means, for we will use it a lot in dealing with Steam Condensation.

For ease of calculation, we must have some unit of measurement, gallons of water, feet and inches of distance, pounds per square inch for pressure, etc., etc. For example, one thousand pounds pressure conveys nothing to our minds, but one thousand pounds pressure per square inch does. One hundred and fifty miles conveys nothing to us, it might be height, depth, or distance away, but when coupled to any dimension it does mean something. One hundred and fifty miles high, for instance, conveys something definite to our minds.

33,000 lbs. means nothing to us, but if we take 33,000 lbs. and lift it one foot high it represents foot-pounds of work done, and further if we do the work in the space of one minute it represents 1 h.p.

The foregoing enables us now to understand the meaning of the term B.T.U. and how we may intelligently use this unit of measurement.

Let us now begin our inquiry into Condensation and what it is, and follow our four operations in the order set out.

To convert a solid to a liquid or a liquid to a gas, we must perform some work, or apply some energy, to effect the physical change. This energy in every case means the application of heat, which is another term for energy. Conversely, to reduce the gas to liquid or a liquid to a solid, we must abstract or remove heat from the gas or liquid, to the same amount which we applied to make the first change.

We will assume we have a lump of ice weighing one pound and at a temperature of 32 degrees F., the point at which water freezes. In order to make the change here from the solid (Ice) to the liquid (Water), we must apply heat, and in the following quantity:

The temperature of ice being 32 degrees F., and the temperature of the melted ice or water being also 32 degrees F., it would seem as though no heat were applied to the ice, but without the application of the heat, the ice would remain ice and solid. Therefore it is necessary to apply to the ice an amount of heat corresponding to the "Latent Heat of Ice," which is 142 B.T.U.

We need not inquire here as to the method of fixing this as the "Latent Heat of Ice." It has been determined for us by scientific experiment, and is accepted as an engineering fact.

When we have applied this amount of heat, the change is affected, the solid has become a liquid, and the temperature remains the same. What becomes of the heat we have applied? We shall see later.

Having made one physical change, we now desire to make another—to convert the liquid into a gas (water into steam), and to do this we must add more heat, and in the following quantity:

Suppose we wish to evaporate this pound of water into a pound of steam, say at atmospheric pressure, which equals zero on the gauge. On looking at our steam table we find that water boils at 212 degrees F. at this pressure.

Therefore we must raise the temperature of the water from 32 F. to 212 F. before we can expect to boil it. This calls for the application of sensible heat to the extent of

180 degrees, which as before seen would be equal to 180 B.T.U.'s. (Heat in water at this temperature, see Steam Table, *.

We now have the water at boiling point at atmosphere pressure and the thermometer says the temperature is 212 F. It is still water, however, and to convert this water into steam we must apply further heat.

Now it is evident that the steam cannot be any hotter than the water with which it is in contact. Therefore the extra heat which we apply to make the physical change from water to steam must go somewhere. Where does it go?

Water is a fluid having a density or weight, this is plain. So is steam, it also has weight; but its weight is very much less than the same bulk of water.

Your steam table shows, as the water turns into steam, its volume becomes greater. One pound of water will occupy, when turned into steam, about 1,700 times the space occupied before the change.

In other words, the physical change which we produce calls for the exertion of energy, to break up the particles, or globules, composing the water, and to expand them into a volume of vapor sufficient to displace 1,700 times the amount of air and occupy the space which contained this air. This is a fairly large amount of work to do, and the energy to do it is supplied by heat.

The amount of heat which is applied to do the work is absorbed by the water in changing into vapor, and remains in the vapor. Our thermometer, however, does not indicate this heat, but that does not alter the fact, we know it is there. Hence the term Latent or "Hidden" Heat.

Turn to the steam table and you will see that steam at zero pressure contains 966 B.T.U. of Latent Heat. Therefore, when we have applied 996 B.T.U. to the water, already at 212 F., we will have changed the water into vapor or steam. Our thermometer shows us that the temperature has not increased, yet we know we have put more heat into the water than we had before. We shall see later how to prove that this amount of heat is present.

We have now completed our first step on the way to a clear understanding of what Condensation is, and we have seen that to make the first two changes in our medium we have had to impart a certain amount of heat. The total heat now in the steam is equal to 1,288 B.T.U., and this is made up as follows: Latent Heat of Ice, 142 B.T.U.; Sensible Heat in the water, 180 B.T.U.; Latent Heat of vaporization, 966 B.T.U.

Now to reverse the procedure, and prove out our reasoning. Always remember the meaning of the terms. The first operation we call liquefaction. The second we call evaporation or vaporization. The reverse operations we call CONDENSATION, and solidification. This helps us to realize just what we are doing.

We have 966 B.T.U. as heat of vaporization. Suppose we had this steam inclosed in a vessel at this pressure, and we were to immerse this vessel in a quantity of water, at a lower temperature. What would happen?

The steam, of course, would give up its Latent Heat to the water surrounding it. This water would gain in temperature at the expense of the steam, until both steam and water were at the same temperature, when we would establish equilibrium, and the steam, of course, would be condensed into its original volume of water.

If the surrounding water had been of the exact quantity, equilibrium would be established at 212 F., the temperature of the steam, because its condensing point must of necessity be equal to the boiling point, as there is where the physical change takes place.

If we wish to get back to our starting point, Ice, we must still further cool the water down to its freezing point, 32 F., by abstracting its sensible heat. Then either by mechanical refrigeration, or by natural means (such as very low temperatures), abstract the latent heat of Ice, 142 B.T.U., when we will find the fourth change take place, Solidification, or water becomes ice, and we are back where we started.

Now it is evident that water freezes, and ice melts, at a temperature of 32 F. Also that water boils and steam condenses at 212 F., as we have seen in our experiments. We have also seen that the only addition, or the abstraction, of latent heat produces the physical changes.

This is the place to correct the erroneous opinion the writer has heard expressed by otherwise intelligent men, "That water of condensation cannot possibly be as hot as the steam from which it is condensed." Further, it is the place to dispose of that other equally erroneous statement, that "Water boils at 212 F."

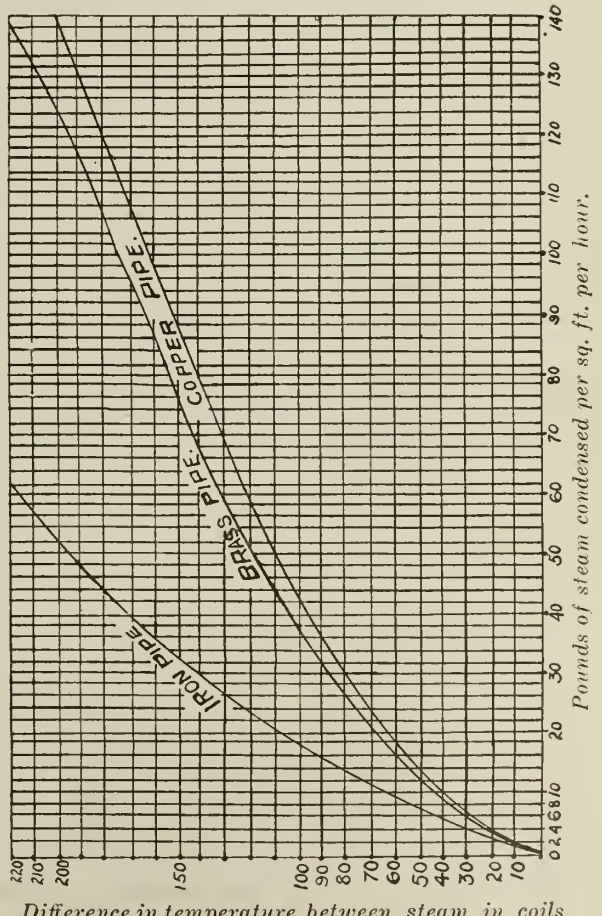
"There is no lie so bad as half the truth," and that this is less than "half the truth" a glance at the steam table will show. Here you will observe that the temperature of the water varies with the pressure. The higher the pressure the higher the boiling point.

It is quite true that water boils at 212 F., but that is at a pressure of 1 atmosphere or 14.7 pounds per square inch. It is also true that water boils at a temperature of 400 F., but this is, however, at a pressure of 235 pounds per square inch. It is equally true that water boils at a temperature of 75 F., but only under a vacuum of 29 inches of mercury.

These erroneous opinions would not be so commonly held if engineers and others interested would give a little thought and study to the properties of steam, as set out in the Steam Table.

It is to be hoped that after studying the foregoing statements, no engineer will again pass such a ridiculous opinion. It does not matter at what temperature water passes into steam, just at the same temperature will steam change back into water. Remember this fact, as it is important, and will be referred to again in these pages.

We have now seen, from our experiments, that "Condensation results from the abstraction of latent heat from



*Steam table referred to will appear in next instalment of this article.

the vapor or gas," and as, "The act of reducing the vapor to liquid form." We are concerned here only with the vapor which we call steam, and we will now go on to consider Condensation, as it occurs in our steam system, and why it occurs.

We may begin by stating that there are two kinds of Condensation in steam plants, one kind being undesirable condensation, and the other kind highly desirable. The undesirable condensation we wish to avoid entirely, if we can. The other kind we want to produce in the largest possible volume, and for these reasons:

In using steam for heating, in process work, we simply employ the steam as a means of conveniently transmitting heat, under flexible control, with safety from fire risks, from one convenient central location to the various points where we wish to employ the heat in our work.

This being so, our main object is to handle our steam so as to cause as little loss as possible in transmitting it from the boilers to the work which we have to do. The chief source of loss in transmission is due to condensation of the undesirable kind. This we do our best to avoid, as it produces no useful effect.

We try to deliver our steam dry, free from entrained water of condensation, and as near the temperature of dryness as obtained on leaving the boilers, so that we do not lose unnecessary heat units on the way to the work. and having got the steam to the work we then by various means and devices try to induce the steam to condense rapidly and give up its heat.

The whole efficiency of any drying, heating, cooking, or evaporating machinery, or surfaces, depends on how quickly we can induce the steam to condense. "Condensation means giving up heat."

This will be readily apparent in considering a simple example of "Process" work. Let us consider a Dye House Plant, or a Laundry, or any similar plant where hot water is required in considerable quantities. Assume, for example, that our plant requires about 20,000 gallons of hot water per hour. That this water is heated in a closed tank by means of live steam at 100 pounds pressure at the boilers. This steam flowing through copper of brass heating coils submerged in the tank.

The water flows through the tank from a city water main, or other source of supply, and has a temperature of, say 45 F. The water is to be delivered to the tubs at a temperature of 200 F. The rise in temperature is (200 F. minus 45 F.) 155 F.

To do the work of raising the temperature 155 F. requires the application of 31,000,000 B.T.U. Remember now what a B.T.U. means—"1 pound of water raised 1 degree in temperature."

20,000 gallons x 10 equals 200,000 pounds x 155 F. equals 31,000,000 B.T.U.

This amount of heat must come from the steam, and to give this heat the steam must "Condense and give up its Latent Heat" to the surrounding water in order to do the work. As each gallon of water must absorb 1,550 B.T.U. (10 x 155=1,550), it follows that if we could deliver the steam at the same heat and dryness at which it left the boilers, 1.77 pounds of steam condensed and yielding up its Latent Heat would do the work (see Steam Table).

If we allowed our steam to condense and lose heat (Sensible Heat) to the extent of say a five pound pressure drop by the time it reached our heating tank, we would require about 1.76 pounds of steam to do the work, a somewhat smaller amount in volume. Our temperature, however, would drop about 4 degrees F., and therefore our "rate of condensation" would be reduced and in the same time and through the same amount of heating surface, our total flow of heat would be less. "The rate of condensation depends on the different temperatures obtaining between the steam in the coils and the water surrounding them."

By looking at the Condensation Chart we shall see the reason for this. In the first case our steam temperature at 100 pounds pressure is 338 F. The average temperature is 122 F. $\left(\frac{45 \text{ F. plus } 200 \text{ F.}}{2}\right)$. The temperature differences therefore between steam and water is 215.5 F. In the second case, the steam temperature is 334 F., and the temperature difference is 211.5 F. (4 degrees F. less.)

A brass pipe coil at 215 F. temperature difference will condense about 140 pounds of steam per square foot per hour, while at 211 F. temperature difference the same surface would condense only 134 pounds in the same time. (See Condensation Chart.

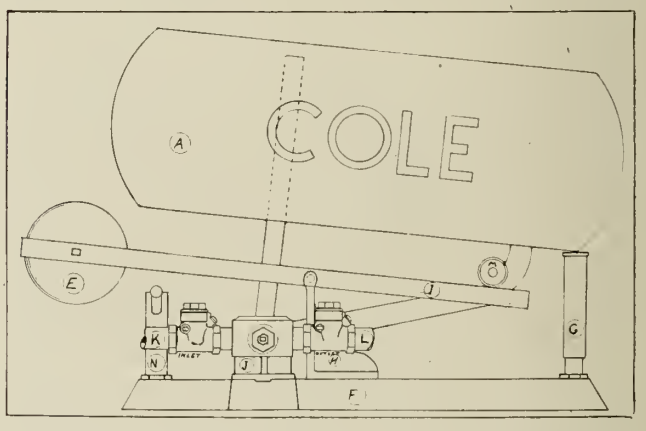
The square foot of heating surface under the first condition would transmit a total of 122,640 B.T.U. The second would transmit 117,652 B.T.U., or a difference of about 5,000 B.T.U. per hour.

This heat difference or loss occurs here, owing to the "Undesirable condensation" in our steam transmission line. The lost heat here represented would raise the temperature of more than 32 pounds of water per square foot of surface at the same time.

The foregoing shows an example of undesirable condensation, which is to be avoided as far as possible in steam lines. It also shows us that our rate of condensation is increased nearly 5 per cent. by proper attention to the removal of condensate from the steam line.

This 5 per cent. increase in the efficiency of our heating surfaces means a further gain in coal economy, equal to at least the same amount, 5 per cent.

Nearly all modern steam plants are designed to reduce transmission losses in the steam distribution. To this end much thought has been devoted to producing insulating materials of such a nature as to prevent heat losses



through the walls of the steam piping system, and to prevent the surrounding air robbing the steam of its heat, and thus causing excessive condensation in the pipes.

All unnecessary condensation is "Undesirable," and represents so much lost energy and wasted fuel.

We may therefore assume that condensation losses in the steam mains have been reduced to a minimum, but this minimum which does occur should be properly handled and efficiently disposed of, as though small in itself relatively, the heat it contains should be saved.

This condensation should be fed back directly to the boilers and not discharged into a heater, there to be cooled down to the feed water temperature. This is quite a simple job to do, and offers no difficulties.

Moving along another step in our inquiry into Condenastion, we arrive at the next point to consider: The application of steam to useful work," and this is where the REAL Condensation Problem begins. Here is where the necessity for careful attention to the disposal of our condensation becomes very important to us. This involves both the factors of economy and efficiency to a very great extent.

Let us resume our work, which is to "Heat up Water."

In our tank we have to heat up 20,000 gallons of water per hour. We have found that this requires a heat exchange from the steam to the water of 31,000,000 B.T.U. per hour.

As we have seen, to effect this exchange we must condense steam and make it give up its latent heat. We have also seen that at 100 pounds pressure we must condense 1.77 pounds of steam per gallon of water heated, or for 20,000 gallons a total of 35,400 pounds must be condensed per hour to do the work.

We have seen earlier that the condensing point of the steam is at the boiling point of the water. The Steam Table shows us that the boiling point of water at a pressure of 100 pounds is 338 degrees F.

When the steam has condensed to water, any further contact with the surrounding water merely tends to reduce the temperature of the condensation. This in turn reduces the rate of heat transmission through the coils. Therefore we should endeavor to drain away this water of condensation before it gets cooler, and, if possible, we should return this water back to our boilers at this condensing temperature, 338 F., thereby keeping up a high temperature difference.

The condensation must be removed, and there are two ways of doing this. One is correct, the other is not. Unfortunately, most engineers have not given this matter of handling condensation the attention it deserves. This is due entirely to carelessness, or ignorance, or else the whims of plant managers or owners who will not heed their engineer's expert advice. Therefore we find the incorrect methods of handling condensation are more generally adopted than the correct ones.

We will assume our plant is operated along the wrong lines, in so far as handling condensation is concerned, and we will see how the change from the wrong method to the correct method affects the results, where fuel economy and efficiency of the boiler plant is desirable.

Usually a plant like this has the return line from the heater passing through a "so-called" steam trap, say of the bucket or float, or other type, which discharges the condensation into a receiver, and from the receiver a pump feeds it back to the boilers.

If we inquire why this trap is inserted on the return line, we will be told that the trap is there "to catch the steam" and hold it back in the coils, and prevent its escape.

If we then inquire why it is desired to prevent the escape of steam, or where can the steam escape to, we will be informed that if we did not hold the steam back it would "escape to the pump," and of course the pump "won't pump steam." The pump would refuse to work, the coils would become water-logged and the whole system would go out of order.

There we have the whole reason, "The Pump," and it is true. "The Pump Won't Pump Steam." This is a physical impossibility, and a little consideration will show why "The Pump Won't Pump Steam." There must be other means employed to handle water of condensation, and this will also be apparent from our consideration.

We know that the boiling point of water depends on the pressure to which it is subjected. Remove the pressure from hot water and the water will at once flash into steam. You know what happens when water at the boiling point of 212 F. passes into a vacuum chamber. carrying about 10 inches of vacuum. It was water under the pressure of the atmosphere, but in the vacuum chamber it becomes steam. This is because pressure to the extent of about 5 pounds per square inch has been removed, making it easier for the particles or globules, forming the water, to separate and form vapor. This is apparent in "Vacuum" boiling pans, and evaporators.

This is what happens to the water of condensation, when connected to the suction end of a pump. The pump removes the pressure creating a vacuum to induce the flow. Natural laws do the rest. The pump becomes "Steam-bound," it cannot help it.

Therefore in order to accommodate a pump and to keep steam from flowing to it, a "so-called" steam trap is inserted on the return line. The immediate effect of this trap is to lower the temperature of the condensation. Lower the efficiency of the heating apparatus. Retard the operation of the process. Interrupt the circulation of the steam, thereby increasing the cost of fuel which provides the heat.

In addition to this, another effect of introducing a trap receiver and pump, is to provide a multiplicity of intricate moving parts. Liability to derangements, and a consequent increase in the amount of time and money which must be spent to keep them in repair and efficient working order.

In average practice the temperature of steam condensation under these conditions (and owing to them), as delivered to the pump, may run as high as 200 F., but more often the temperature does not exceed 180 F. This may be taken as an average temperature for this class of work.

In order to see how this affects the economy of steam production, let us refer once more to the Steam Table. Assume the condensation is all cooled down to 180 F. and then pumped into the boilers.

The Steam Table shows that steam at 100 pounds pressure contains a total of 1,185 B.T.U. The total heat in water at 180 F. is 148 B.T.U. Therefore, to raise water from 180 F. into steam at 100 pounds pressure requires an amount of heat equal to 1,037 B.T.U. per pound (1,185–148). With boilers of say 65 per cent. efficiency burning coal of a heat value of, say, 12,000 B.T.U. per pound, each pound of coal would yield 7,800 B.T.U., which would be usefully employed in making steam in the boilers. As each pound of steam under the above conditions requires 1,037 B.T.U., it is a simple matter of arithmetic to see that 1 pound of coal would make 7.52 pounds of steam

$$\frac{7{,}800}{1{,}037} \text{ equals } 7.52)$$

With the same conditions at the boilers, but with the condensate from the coils feeding directly back to the boilers, with our steam trap, receiver and pump (which is the correct manner of handling condensate), and at a temperature corresponding to the condensing point of the steam, 338 F., the amount of water evaporated per pounds of coal would be materially increased.

The heat in the water at 338 F. is 306 B.T.U. (this is not strictly accurate, being slightly more than this, but will do to illustrate). The total heat of the steam is the same, 1,185 B.T.U.. The heat difference in this case to be added to the water to make the steam is 879 B.T.U. (1,185–306). This is a clear saving of heat amounting to 158 B.T.U., or more than 15 per cent. of the heat required in the first instance, when the water was at 180 F.

Let us now see what difference in fuel consumption we can make by adopting the correct method of disposing of our condensation.

Our process work demands the exchange of heat from steam to water, and requires the condensation and re-evaporation of 35,400 pounds of steam per hour. Under the boiler conditions stated, with an evaporation rate of 7.52 pounds for water per pound of coal, we should require to burn 4,07 pounds of coal per hour to furnish steam to our coils. $\left(\frac{35{,}400}{7.52} = 4{,}707\right)$.

Under the same boiler conditions but with the condensation feeding direct to the boilers at 338 F., the evaporation would be at the rate of 8.85 pounds of water per pound of coal, or a total consumption of coal of about 4,000 pounds to furnish the steam to the coils, a net saving of 700 pounds per hour, or 3½ tons per day of ten hours.

With coal at $3.00 per ton (which is considerably less than a great many plants are paying to-day), this would amount to $17.50 a day, or $5,250.00 a year. Surely this shows that it is worth while to investigate the condensation problem in this plant.

If the plant were smaller, the saving in fuel would be smaller relatively, but the proportion would be the same whether larger or smaller, under the conditions investigated.

As we can feed this condensate into the boilers

direct, without steam traps, receivers and pumps, our reduced costs of maintenance and the saving of steam used in operating the pumps, means further economy.

So far we have dealt with fuel saving in making our steam, let us see how much fuel we can save by cutting out our pump.

Assume the pump is of the usual Duplex type, steam driven. This pump is rated as an extravagant user of steam, and we all know it is, taking as it does around about 120 pounds of steam per H.P. per hour to operate it.

Our pump duty is the moving of 35,400 pounds of water through a head or height equal to 100 pounds pressure, about 230 feet, therefore the H.P. is equal to 4.09 H.P., which is the actual work done in feeding the boilers.

This kind of pump, however, develops the least efficiency of any steam engine, and the actual H.P. should be doubled.

On this basis we may figure the pump requires 8.18 H.P., in the shape of steam. As it uses about 120 pounds per H.P. per hour, this would amount to 981 pounds of steam per hour.

All this steam, of course, comes from the boilers. Our rate of evaporation is 7.52 pounds per pound of coal, so it follows we must turn about 135 pounds of coal per hour to run the pumps.

981 pounds of steam, would, if applied to our heating coils, heat up 500 gallons of water in the same time. So the question arises, why not save this coal? or at least use it where it will do some useful work,

Our yearly loss from this item amounts to about 200 tons. This also is worth saving.

It is not necessary here to review the losses due to holding the steam in check in our heating coils, as this has already been dealt with.

We have seen enough to learn that if we can cut out traps, receivers, and pumps in a case of this kind, and return the condensation directly into the boilers, we can make a considerable saving in fuel and time. Let us see how it may be done.

There are certain physical properties in steam. These are fixed and they are dependent one on another. Temperature, Pressure, Weight, and volume. We cannot affect one property without affecting the others. We are concerned for our purpose with two only. Temperature and pressure. Here is how they affect the problem of dealing with condensation in the steam plant:

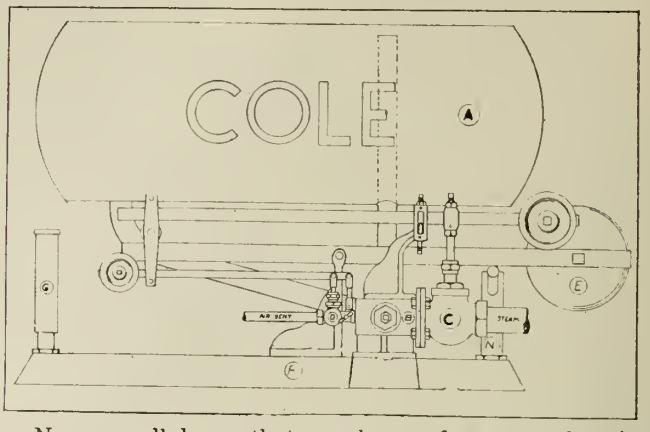
When we begin to take steam on its circuit from the boilers to the point of application of heat exchange, we at once start to lose heat from the steam. By the time we get the condensation through our coils in the return lines back to the boilers, we have lost some of the heat. It may be only a few degrees, but that few degrees, as the Steam Table shows, is equal to a lower pressure than we started with. It may be only a few ounces of pressure lost, but that loss, small though it is, has important effect on our problems.

It is evident that if a boiler is steaming at 100 pounds pressure we cannot introduce water into that boiler at anything less than 100 pounds pressure. Therefore the loss of even a few ounces pressure per square inch would prevent our returning the condensation into the boilers. When we consider also that there is energy absorbed in overcoming the friction in the pipes, it will be apparent that no matter how we care for this loss it cannot be avoided. It is impossible to start from the boilers and get back again at exactly the same pressure we started with.

For this reason the pumps have been provided to make up the lost pressure, by mechanical means. The same effect can be produced by Natural means, and by applying "Natural Laws" to the problem in hand.

Assume our boilers and our heaters or tanks are all on the same ground level. It does not matter whether they are or not, or whether the boilers are above the heaters or the heaters above the boilers. The following solution of the problem of getting water at low pressure into boilers at high pressure is applicable to all conditions, with but slight modifications.

The water line of the boilers may be, say, 15 feet above the ground level. The water of condensation may be on the ground level, a distance of 15 feet in vertical height, and the pressure in the return line at this point may be 1 pound less, for example, than the pressure in the boilers.



Now we all know that a column of water 1 foot in height exerts a pressure of slightly under ½ pound per square inch. Conversely the pressure of half a pound per square inch will support a column of water 1 foot in height. These are engineering facts, and they enter into the problem of handling condensation.

Our problem is to provide by natural means a missing pressure of one pound per square inch, in order to enter the boilers, and this is how we do it under the conditions stated.

Having cut out our trap and pump, we offer no obstruction to the free passage of steam from the boilers, through the heaters, and steam and water will pass through the heater outlet at a high velocity and pressure.

Suppose we pipe from this outlet to a point which we fix at about 3 to 4 feet above the water line in the boilers, and as close and convenient to them as may be, and then open up our steam main. What will happen?

The rush of steam at this pressure and velocity, will sweep the water entrained in it to this point. Even if the pipes and the system were full of water this would occur, because as a pound pressure will support a column of water 2 feet high, and we have a pressure of a hundred pounds on our system, we have enough pressure to sweep the water before the steam to a height of 200 feet. All we require is for the steam to sweep this water or lift it to a height of 19 feet.

In lifting the water some pressure is absorbed, but this is at the expense of the latent heat in the steam, the Sensible heat of the condensate will remain the same.

Having piped the condensate to this point (4 ft. above the water line) we next provide some receptacle to catch it, say, a tank and we provide this tank with an automatic air-relief valve. We build this tank of sufficient strength to safely carry the boiler pressure.

Having fixed this tank at 19 feet vertical height over our return line, 9½ pounds pressure on the coils will sweep the water into it. As we have 100 pounds pressure on the coils, the pressure difference will give us a very high velocity, which will fill our tank in a very few seconds.

We will support this tank "off the centre" and on a movable pivot or bearing. As the tank is not supported in balance it would tend to fall over from the horizontal, therefore to keep it in the horizontal position we will provide a balance weight. We will also provide a means of support at one end, to hold the tank when horizontal and at the other end to catch the tank when it falls forward. (See illustrations.)

(Continued in next issue)

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Advances have been recorded in almost every line with which the plumbing trade has to do in the period since last issue. Certain classes of valves have been moved higher and discounts on unions of various descriptions have been recorded. In enamelware there has been a change upward in closets, but bathtubs and sinks remain unchanged. Oakum is quoted higher in some quarters. On range boilers there has been an approximate advance of 10 per cent. The situation in the steel market is such that manufacturers are unable to get promise of delivery before September. This is having the effect of causing a scarcity of material for range boilers. Some manufacturers have about reached the point where they are unable to make further quotations. Under these conditions a famine is highly probable in this line. Lead pipe and lead waste pipe have been moved to higher levels and lead traps and bends have also been increased. Lead sheets have been marked higher by 1c per pound. Further advances may be expected on lead products. Both black sheets and galvanized sheets have been moved upward. An advance of approximately 10 per cent. has been recorded in boiler tubes. Business in plumbing lines has been fairly good in the face of war conditions.

TORONTO, June 14.—There is no indication of any lower prices in plumbing lines as price movements have all been in an upward direction within recent weeks. Important lines have been affected in the ascending of prices. Business in plumbing lines is reported fairly good. There is a fair demand coming from country districts, as reported by some firms, whereas others state the trade from the shipbuilding industry and other industrial plants is fairly heavy. Shortage of supplies are developing in some lines of goods, notably in range boilers. Manufacturers are unable to get deliveries of raw materials for the manufacture of these goods earlier than fall. In the meantime stocks are low.

Unions Go Higher; Soil Pipe Holds Steady

SOIL PIPE, FITTINGS.—Unions up to 3 inches have been increased in price through the changing of the discount from 50 per cent. to 45 per cent. off list. Flange unions standard have also been advanced in some quarters, the discount now prevailing being 30 and 5 per cent. with some firms and 40 per cent. with other firms. Net prices of malleable fittings for Class C have been increased 1c per pound, now making the price of plain black 13c, and 20c per pound on galvanized. Demand for this class of goods has been fairly good.

Medium and extra heavy soil pipe, 6-inch and under	40%	45%
8-inch soil pipe	....	35%
Medium and extra heavy fittings, and under	....	50%
Cast iron fittings	30%	32½%
Malleable fittings, Class A	20%	on list
Do., Class B and C	Net list	
Cast elbows, tees, etc.	30%	32½%
Unions up to 3-inch	....	45%
Plugs	40%	42½%
Bushings	40%	42½%
Flange unions, standard	30, 5%	40%
Nipples, up to 4-inch	....	50%
Do., 4½-inch and larger	....	45%
Do., running thread 4-in. and under	....	30%
Dart unions, ¼-inch to 2-inch	39%	39½%

Radiator Valves Have Been Increased

VALVES.—Patent quick-opening radiator valves have been increased in price by the changing of the discount, and amounts to approximately 7½ per cent. Concerns who formerly quoted these valves at 55 per cent. discount are now quoting at 50 per cent. off list. Other concerns who were quoting the Jenkins' disc radiator valves at 45 per cent. discount have altered the price to 40 per cent. off list. Where the quick-opening valves were formerly quoted at 45 per cent. discount they are now at 40 per cent. off list. The discrepancy in quotations on these classes of valves is due to use of different lists. There is a continued heavy demand for valves, both from shipbuilding concerns and from industrial plants.

	Discount off list
Ground work	35-53
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0 standard	53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	7½
Radiator valves, standard	15
High grade	7½
Patent quick opening valves	50
Basin Cocks—	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	40
Radiator valves, Jenkins disc	40
Radiator valves, quick opening	40

Closets Have Again Advanced $1 Per Set

ENAMELWARE.—Higher prices were recorded in closets during the week by $1, which now makes the price of oak tank and oak seat sets $22, while the enamel iron or white vitro tank with oak or mahogany finish is now quoted at $23.75. Prices on bathtubs and sinks remain unchanged at quotations given in last issue. Demand for enamelware has been fairly good, although high prices are operating to curtail installations except where the need is urgent.

Bath-tubs, roll-top, 4, 4½, 5 feet, 24 to 30 in. wide	$28.50
Bathtubs, 5½ ft.	32.10
Sinks, roll-top, 18 x 30 in., staple	14.60
Closets, oak tank and seat	22.00
Do., enamel iron or white vitro tank	23.75

Plumbers' Oakum Up With Some Dealers

OAKUM.—Prices on plumbers' spun oakum have been moved to higher levels by some concerns who are now quoting up to $10.50 per hundred pounds in full bales and $11 per hundred pounds in less than bales. Quotations are still made as low as $8.50 by some concerns. Demand for oakum has been fair.

	Per 100 lbs.	
Best American	....	$21.00
U.S. Navy (American)	....	20.00
Plumbers' Spun	8.50	10.50

10 *Per Cent. Advance On Range Boilers*

RANGE BOILERS.—An advance of approximately 10 per cent. has been made effective on all sizes of range boilers, standard 30-gallon now being quoted at $13 each, an advance of $1. On the 30-gallon extra heavy boiler the increase amounts to $2.50 each, the new price to the plumbing trade being $17 each. Demand for range boilers is reported good, but manufacturers are facing the difficult situation of being unable to get delivery of ad-

ditional supplies of steel sheets before September. In the meantime stocks of boilers are low and it would seem that a condition approaching famine is rapidly coming in this article.

30-gallon range boilers, standard	$13.00
35-gallon standard	14.15
40-gallon standard	15.50
52-gallon standard	28.00
30-gallon extra heavy	17.00

Steel Situation Gives Strength To Wrought Pipe

WROUGHT PIPE.—With an acute situation in the iron and steel market, which prevents manufacturers from getting but very meagre supplies for domestic purposes, the condition is reflected in wrought iron pipe. Deliveries of raw materials for the manufacture are away behind and production has necessarily been curtailed. Demand is apparently heavy, due to the restricted output of the manufacturers. Prices remain unchanged during the time intervening since last issue. Manufacturers are short on a number of sizes.

Size	Black Per 100 feet	Galvanized Per 100 feet
Standard Buttweld		
⅛ in.	$ 4 50	$ 6 00
¼ in.	4 96	7 00
⅜ in.	4 96	7 00
½ in.	6 29	7 86
¾ in.	7 94	10 06
1 in.	11 73	14 88
1¼ in.	15 87	20 13
1½ in.	18 98	24 06
2 in.	25 53	32 38
2½ in.	40 95	51 77
3 in.	53 55	67 70
3½ in.	66 24	83 26
4 in.	78 48	98 65
Standard Lapweld		
2 in.	28 49	34 97
2½ in.	42 71	52 94
3 in.	55 85	69 23
3½ in.	68 08	86 02
4 in.	80 66	101 90
4½ in.	93 98	118 70
5 in.	109 50	138 40
6 in.	142 10	179 50
7 in.	185 60	232 05
8 L in.	195 00	243 75
8 in.	224 60	280 80
9 in.	269 10	336 38
10 L in.	249 60	312 00
10 in.	321 40	401 70

Prices—Ontario, Quebec and Maritime Provinces

Conductor Pipe And Eavetrough May Go Up

CONDUCTOR PIPE, EAVETROUGH.—As indicated in HARDWARE AND METAL last week, there is a very strong market for the conductor pipe and eavetrough, and higher prices would not be improbable. At the time of writing no change has been reported, being still quoted at 25 per cent. off list. The situation is dominated by the position of the raw material market.

Black And Galvanized Sheets Both Higher

SHEETS, PLATES. — Still higher prices prevailed on both black and galvanized sheets during the week. In some quarters black sheets were advanced $1 per hundred pounds, while on galvanized sheets the increase was all the way from $1 to $2 per 100 lbs. On galvanized sheets the highest quotation was $12 per 100 pounds, which represents an increase of $2 during the week. Supplies of these latter sheets are very scarce and hard to get. One dealer reported that he had a couple of cars on the way, but that it was impossible to place additional orders. Plates are in very firm market owing to the heavy demand for shipbuilding. Following are the prices prevailing:

	Per 100 lbs.	
BLACK SHEETS—		
10 gauge	$ 9 25	$ ....
12 gauge	9 35	9 55
14 gauge	9 40	9 45
16 gauge	9 50	9 50
18-20 gauge	9 40	9 30
22-24 gauge	9 45	9 35
26 gauge	9 50	9 40
28 gauge	9 60	9 50
29 gauge	....	9 60
3-16 inch plate	....	10 10
¼-inch boiler plate	....	10 00
GALVANIZED SHEETS—	Per 100 lbs.	
10¾ oz.	$11 00	$12 00
U.S. 28	10 70	11 70
U.S. 26	10 40	11 40
22 and 24	10 25	11 25
18 and 20	10 10	11 10
16	9 95	10 95
14	9 85	10 85

F.o.b. Hamilton, Toronto.

Corrugated Sheets Mostly Open Prices

CORRUGATED SHEETS.—Governed to a large extent by the firm situation in plain galvanized sheets, the market for corrugated has shown no disposition to easier prices. The trend is all in the opposite direction; so much so that dealers are not quoting firm prices. As one dealer put it: "There is really no fixed market on these sheets, being in reality at open prices. Scarcity of the plain galvanized sheets is responsible." Following are quotations, which are nominal:

	Galvanized Per 100 Sq. Feet	Painted Per 100 Sq. Feet
No. 28 gauge	$7.25-$7.75	$ 6 00
No. 26 gauge	8.00- 8.50	6 75
No. 24 gauge	12 00	9 00
No. 22 gauge	14 50	11 00
No. 20 gauge	17 00	13 50
No. 18 gauge	22 00	17 00

Boiler Tubes Have Advanced 10 Per Cent.

BOILER TUBES.—As intimated in these columns last week, boiler tubes have been advanced, the increase amounting to approximately 10 per cent. Local dealers report that when present stocks are exhausted it will in all probability be impossible to place further orders with manufacturers in the United States. Spot stocks, however, are fairly heavy, and may probably last the balance of the year. After that time dealers look forward to the possibility of a famine in these goods. Following are the quotations:

	Per 100 Feet Cold Drawn	Lapweld
1-inch	$30 00	$.....
1¼-inch	36 00	.....
1½-inch	39 00	44 00
1¾-inch	42 00	33 00
2-inch	42 00	33 00
2¼-inch	44 00	36 00
2½-inch	52 50	40 00
3-inch	55 00	45 00
3¼-inch	....	51 00
3½-inch	65 00	55 00
4-inch	74 00	68 00

Lead Pipe And Lead Sheets Are Up

LEAD AND ZINC PRODUCTS.—An increase of 1c per pound was recorded in lead pipe and lead waste pipe during the week, which now makes the selling price on these commodities 19c for the former and 20c for the latter. Lead wool has also been increased 1c per pound, and is now quoted at 17c. All sizes of lead sheets have been advanced is price 1c per pound, to 3 and 3½ lbs. to square foot being quoted at 17¾c, and 4 to 6 lbs. per square foot being quoted at 17½c. The situation in this market has been due to the strong position of pig lead. There has been a good demand for all lead and zinc products.

Lead pipe, lb.	$ 0 19	....
Lead waste pipe, lb.	0 20	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 17	....
Lead sheets, 3 lbs. sq. ft.	0 17¾	....
Lead sheets, 3½ lbs. sq. ft.	0 17¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 17½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 42	....
Solder, strictly, lb.	0 41½	....
Solder, commercial, lb.	0 40	....
Solder, wiping, lb.	0 40	....
Solder, wire, lb.	0 45	....
Zinc sheets, per lb.	0 26	....

Old Cast Iron Advances $1 Ton

OLD MATERIALS.—There was a generally steady situation in old materials during the week, with but one exception, namely, that of old cast iron, in which the price dealers are prepared to pay has been increased by $1 per ton. There is a firm undertone to the market, however, with a fair demand at present from manufacturers.

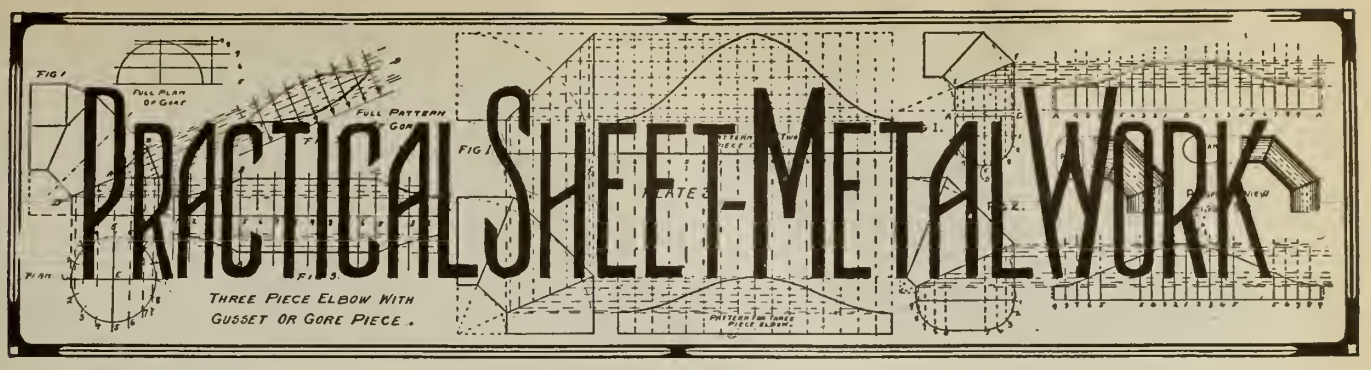
Tea lead	$ 0.08½	.....
Heavy lead pipe	0.10½	.....
Yellow brass	0.15¼	0.15½
Red brass	0.22	.....
Light brass	0.09½	.....
Heavy zinc	0.08½	.....
Heavy copper	0.26	0.27
Old cast iron, per ton	....	25.00
Stove plate, per ton	16.00	17.00
Old rubber, boots and shoes	0.09	.....
Overshoes, lumbermen's rubber boots	0.09	.....
Auto tires	0.06½	.....
Bicycle tires	0.03½	.....

Pig Lead Soars Up; Antimony Is Easier

PIG IRON.—Prices on pig iron are still withdrawn. There is a great scarcity of iron, and the fact that a quotation of $52 ton Pittsburgh has been reached is evidence of the condition of the market.

LEAD.—Pig lead occupies a prominent position in the limelight at present. Sales of pig lead have been made in New York at 12c lb., and a bid of $11.75 for a 100-ton lot was not taken up. The trade has been patiently awaiting action from Washington with regard to the Government requirements. The market is decidedly strong, and prices have advanced to 15½c lb.

COPPER.—There is a suspicion in the United States that the North Butte Mine was deliberately fire . There was considerable loss of life, and production in this district will be set back. Copper in New York is firm and higher for future deliveries. Locally the price is 37½c to 38c lb.



BY THOMAS STANFIELD

THE next furnace fitting to be described is shown in Fig. 1. This is a type of shoe to be inserted into the rectangular stack pipe B. C is the side view of the rectangle.

A fitting of this type is used between the warm air pipe at the foot of the warm air vertical stack pipe, and is a very simple fitting to make. Fig. 1 may be used as pattern for side, allowing material for locks. To develop pattern for piece between B and A divide into equal parts as shown at A, 1, 2, 3, 4, 5, 6, B. Then draw a perpendicular stretchout line as shown in Fig. 2, B,[1] A.[1] Next transfer the measurements from A B, Fig. 1 to Fig. 2, as shown, and draw another line B.A. Then B B[1] A A[1] will be the size of sheet metal required.

Fig. 3 is front view of the fitting, Fig. 4 is the pattern for throat of shoe as shown in Fig. 1, C. D. E.

Fig. 5 is the pattern for square to round piece shown in Fig. 1 at E A. Allowance for seams must be made in every case, these have been described in previous articles in this course.

Another fitting which will be found to be very handy is an offset for the stack pipe Fig. 6. Solid lines shows the regular style, but it will be plainly seen the curved type is a much more desirable kind providing there is room in the partitions to place it. The round curves do not set up as much friction as the square sharp cornered ones shown in dotted lines. Fig. 7 shows the pattern for the material required, which is self-explanatory.

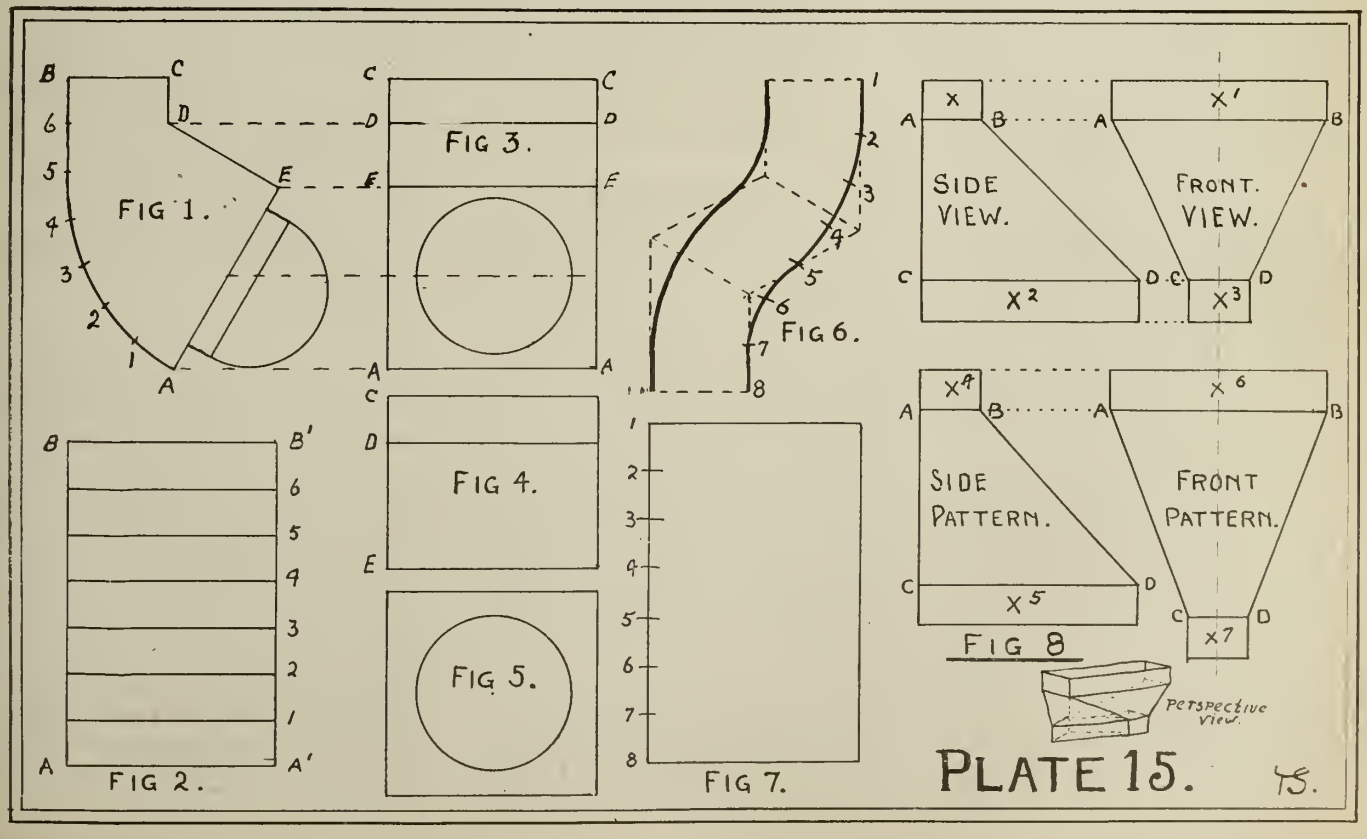
Fig 8 is another fitting which though not often used, is very handy, that of a rectangular offset. This type of warm air fitting is used where one partition crosses the one in which a stack pipe is being installed.

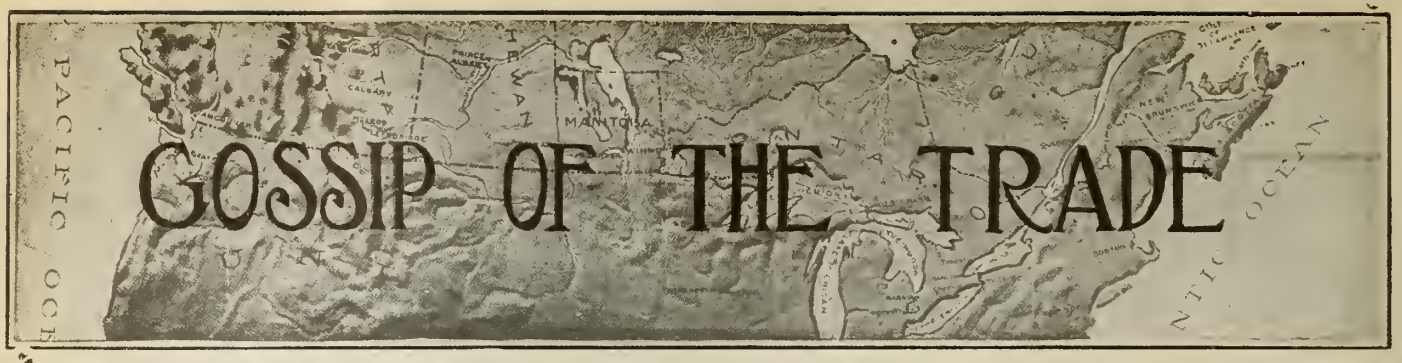
The side view shows that the back A C is perpendicular, while the front B D is slanted. Then the front view gives the slant of the sides. To develop patterns for this fitting is very simple, though some metal workers find it an awkward task.

First draw a dotted line as shown. Through front view and pattern draw the rectangle A. B. X6. Next draw sides C. D. X7. Now take compass and measure the length of slanted side B. D. on side view. With this measurement join the two rectangles X6 and X7 as shown on front pattern. This will give the desired amount of material for front.

For side pattern follow the same course by drawing first the two rectangles X4 and X5, then using the measurements at side of front view A.C., and transferring these by connecting the rectangles X4 and X5 as shown at AC. The slant line BB on side pattern is the true length of the material for side. By going over the various measurements with compass, these can be easily proved. Allow for seams according to style required.

(Continued in next issue.)





TRADE GOSSIP

St. John's, Nfld.—Thos. Clancy, sanitary inspector of the city, is dead.

Tilbury, Ont.—The Town Council contemplate installing a pumping plant.

St. Romuald D'Etchemin, Quebec. — Tremblay & Cie, plumbers, have dissolved.

Toronto, Ont.—George Miller, formerly plumber with Consumers' Gas Company, has been twice wounded at the front.

St. Thomas, Ont.—The St. Thomas Packing Co. will have to vacate their property to make way for a sewage disposal plant.

Montreal, Que.—P. E. Mercier, city engineer, and Controller C. Cote, favor installing a garbage destructor plant to cost $1,000,000.

Lethbridge, Alta. — Roberts Filter Manufacturing Company expects to complete this year the construction of a filtration plant here.

St. Mary's Ont.—The Town Council will likely expend $1,500 for the purchase of a small motor-driven pump for the dumping plant.

Winnipeg, Man.—Empire Electric Plumbing & Heating Co., Ltd., of Winnipeg, has changed style to Electric Plumbing & Heating Co., Ltd.

Toronto, Ont.—British American Rubber Co., Ltd., has been incorporated with a capital stock of $250,000, to manufacture and sell rubber goods and supplies.

Stratford, Ont.—Representatives of Sarnia City Council recently inspected the incinerator and waterworks plants here, in order to secure information for the establishment of an incinerator at Sarnia.

Chatham, Ont.—Decision has been awarded by Drainage Referee Henderson, that the township of Harwich must repair the work of the Burk drainage scheme in Harwich, which is reported in bad condition.

Brantford, Ont.—Brantford Water Commissioners have engaged experts to investigate the local waterworks with a view to permanently increasing the supply and ascertaining the advisability of installing a mechanical filter.

Hamilton, Ont.—The Provincial Board of Health has granted the city's application in regard to waterworks extensions. An expenditure of $127,000 on new pumps at the Beach station is now authorized without reference to the ratepayers.

Toronto, Ont.—The York Township Council passed a by-law authorizing the clerk to take preliminary proceedings for the construction of a 6-inch water main to supply residents at Baby Point Crescent, between Langmuir avenue and Talbot Place.

UNDERGONE AN OPERATION

The friends of E. B. Armstrong, Eastern representative of the Ontario Wind Engine & Pump Co., will be pleased to know that he is progressing favorably after having undergone an operation for appendicitis. He expects to be calling upon his patrons at an early date, if his present rate of recovery does not get a set-back.

TYPOGRAPHICAL ERROR

Our readers will kindly note that the signature of the chairman of the Educational Committee in our last issue read as follows: Geo. E. B. Pringle. This was not correct, and should have read, Geo. E. B. Grinyer. Mr. Grinyer is a good worker in the society, is a progressive craftsman who is making good.

In Guelph, his home town, he is looked upon as being one of the live wires.

A. R. CALCOTT WITH DOMINION RADIATOR CO.

A. R. Calcott, who has joined the traveling staff of the Dominion Radiator Company, Ltd., for whom he is covering Western Ontario, has had a long connection with the craft. Starting in the trade twenty-five years ago with the old firm of Smith Bros., London, with whom he served his time, Mr. Calcott subsequently represented several firms on both sides of the border. Twelve years ago he went with Messrs. Noble & Rich, of London, where he remained for four years, following which he became heating engineer for the George E. B. Grinyer Co., Ltd., of Guelph. This was the last position held by Mr. Calcott prior to his appointment with the Dominion Radiator Company.

ENLARGING FACTORY

The Geo. W. Cole Company, 838 Dundas street, Toronto, recently procured a charter and will now be known as the Geo. W. Cole Co., Limited, Condensation Engineers, Toronto. This concern has made considerable progress within the last year and are now making an addition to their factory which will increase their floor space at least 40 per cent.

SANITARY PAIL CLOSETS FOR 600 REGINA HOMES

If the recommendation of the city commissioners of Regina is sanctioned by the City Council, equipment with sanitary pail closets will be provided for some six hundred houses in the city, which are built on sewer and water lines, but which are still without modern plumbing facilities. When the six hundred pails have been purchased and the necessary pipes and elbows for ventilation bought, at a cost of $1,430, are installed, the last of the old fashioned box or pit closets, which are generally recognized as a menace to the health of a community, will have disappeared from Regina.

This work is really a completion of the movement to abolish the box closets which commenced in 1913 when the City Council of that day passed a regulation to banish the box closets from all houses beyond the sewer and water lines. It was the intention at the time, when this had been done, to require all houses served by sewer and water to instal modern plumbing facilities, but in view of the financial stringency followed by the war, the council of 1914 felt it inexpedient to pass a measure which would have entailed considerable expense to property owners at a time when cash was a scarce commodity.

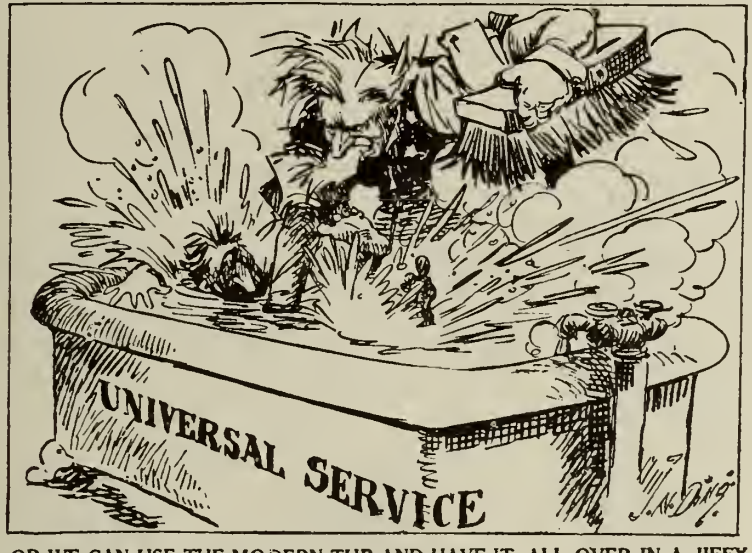
The question was discussed several times, and it was suggested that the city might incur the necessary expenditure to equip all houses on sewer and water with plumbing, charging the cost up to the property and making provision for repayment in annual instalments, but the same reason which impelled the aldermen to shrink from asking individual citizens to incur this expenditure made them refrain from saddling it upon the ratepayers as a corporation.

Since that time nothing has been done, and in view of the inadvisability of requiring plumbing to be installed in all houses on the sewer and water line at the present time and health authorities, through the commissioners, are asking the council to take the step outlined above as a temporary measure.

IT DEPENDS ON HOW ANXIOUS WE ARE TO HAVE IT OVER.



WE CAN MUSS AROUND WITH A BASIN OF HOT WATER AND NEVER GET THE JOB REALLY WELL DONE



OR WE CAN USE THE MODERN TUB AND HAVE IT ALL OVER IN A JIFFY.

The above cartoon speaks for itself and refers, of course, to some of the methods being adopted by Uncle Sam with a view of making a quick clean-up of this war business.

A lesson can be drawn from it by sanitary and heating engineers, if they really want wrongs righted; there is no use using "tin dish" methods to once and for all overcome them.

It just depends how anxious we are to remedy the existing evils that really counts.

LETTERS TO THE EDITOR

Editor, THE SANITARY ENGINEER:

Dear Sir,—I was very much interested in the inquiry headed, "What Should I Charge?" appearing in the Question Box of May 15 issue, and also in your answer to same.

With your permission, I would like to make some comments on this matter, as I believe this is a question which vitally affects every sanitary engineer in the country, and which I believe has not had anything like the attention it deserves.

I was particularly impressed with the inquirer's remarks regarding the success of other business men and his opinions as to what profits they are obtaining, and my personal opinion is that he is not exaggerating the matter very much. If I were answering this question as to what profit he should charge, the first thing I would do would be to impress on his mind strongly that his cost did not simply include invoice price, plus freight, but that overhead expense was just as much a part of cost as these two items mentioned. In other words, to figure up his cost, he must include invoice price, freight, and overhead expense; after this has been done, it is up to him to decide what profit he is entitled to. Speaking of profits, I take exception to the editor's remarks that 20 per cent. profit plus overhead, freight, and invoice price would be extortionate. Possibly this statement might be true were we referring to a $1,000 contract, but it is too broad to apply in a general way.

For instance, let us take a concrete example: We sell a nipple, we will say, which costs, including overhead, 3c. Is there any court in the land that would claim 20 per cent. profit to be extortionate on this item? I simply mention this as an instance of where one rule will not hold good all the way through. I claim that a majority of the small items may justly carry from 75 per cent. to 125 per cent., and naturally the larger ones to be graded according to the quantity sold and their value.

Regarding your remarks on the percentages to be added for overhead expense, I have studied this question considerably in the past ten years and from reports and investigations of almost all small businesses in the United States and Canada, it is considered that a fair average is 20 per cent. on the sales. Now this applies more particularly to the average retail business where as a general rule, there is a big turn-over on the investment and this turnover can be handled on a smaller margin of overhead than the same volume in the plumbing business. Therefore, the percentage of overhead in our line of business is higher.

I think you will agree with me, Mr. Editor, that hardly any other line of business requires as much technical knowledge, supervision, risk and loss as ours for the small yield that the average sanitary engineer is procuring. Therefore, my contention is that 25 per cent. is as low a percentage as we should allow for overhead.

Of course, where a member of our craft has an efficient system of keeping track of these items and does figure out what properly constitutes overhead and as a result his figures show less than 25 per cent. on his sales, and providing that he has produced a reasonable profit on this basis, I would say that he is an exception to the rule.

Personally, I would like to see this very vital question given more attention in the future than it has in the past.

Thanking you for your valuable space,

I remain, Yours very truly,

C. D. HENDERSON,

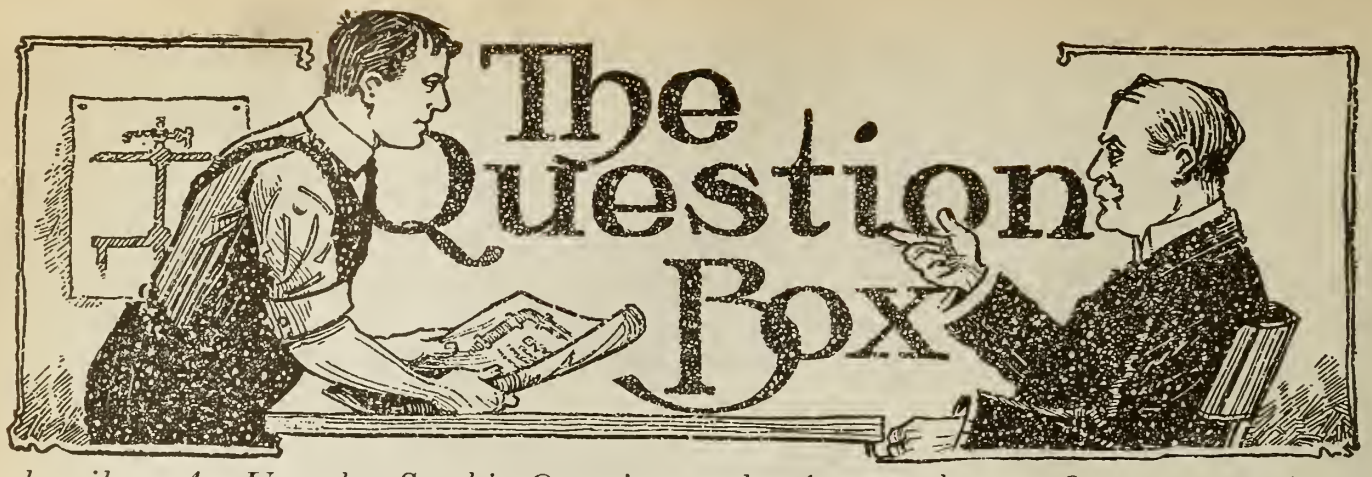
CATALOGUES WANTED

Editor THE SANITARY ENGINEER:

Having taken over the sanitary and heating department recently conducted by J. N. McGregor, Oakville, I would esteem it a favor if you will advise all your advertisers that I would like to procure catalogues and prices on sanitary and heating goods at regular intervals.

GEORGE W. BARRETT,
Sanitary Engineer,
Station Road, Oakville, Ont.

Manufacturers and Jobbers please note the above request.—Editor.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

HOW CAN A SEPTIC TANK BE MADE SMALLER

Editor, THE SANITARY ENGINEER:

I have read with a great deal of interest and benefit, the articles you published about septic tanks, and one point you have several times emphasized was that the contents of the dosing chamber should be discharged at regular intervals, not more than 24 hours between each flush. I installed a septic tank according to your instructions for a house occupied by eight persons, but just recently three of these occupants have left the house not to return except on a visit of, say, a day or two at a time. It occurred to me that the capacity of the septic tank is now too large, and will not discharge as frequently as it has done. It has given splendid satisfaction for two years, and I would not like any trouble to come to the system.

What would you advise doing in a case like this, so as not to have to disturb the system very much? An early reply will oblige.

R. S. E., Ontario.

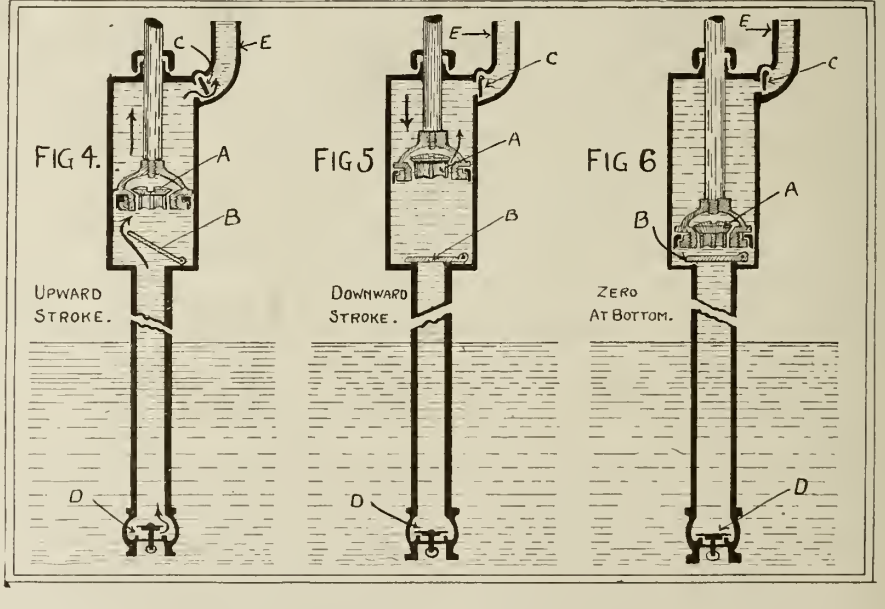
The above no doubt is an interesting question, but one that is likely to come along once in a while, and it raises an important point. The best way to overcome the problem would be to get a number of bricks, or cast some square cement blocks and place them into each chamber to the amount required, so as to make the cubic contents of each compartment the proper proportion for five persons.

This would not disturb or spoil the tank in case a larger number of persons were to again occupy the house permanently. In this connection, we might say that on account of there being also a larger number of field tile laid to take care of the larger quantity of discharge, that the dosing chamber could be decreased so as to allow the discharge to take place every 18 hours instead of 24. This will give the whole of the tile pipe work to do at more frequent intervals.

It will be seen by the above reply that a sewage disposal system is none the worse for being of the fullest capacity likely to be required, when first put in, and even though the blocks or bricks be put into the tanks in the first place, they can be easily taken out, should the system need enlarging on account of an increase in the number of occupants of the building.—Editor.

THE DIFFERENCE IN PUMPS

In the June 1st issue of the SANITARY ENGINEER, one of our readers asked us to describe a number of types of pumps. We described one kind, viz., the common pitcher pump, which is merely a suction pump with pitcher spout. It would be a very easy matter to have a round pipe-line spout and still do the same work as the pitcher pump; therefore, to properly name such a pump would be to call it a suction pump.



By referring to the last issue our readers will note that there is very little difference between the type shown in the last issue and the one described in this article. This pump, however, is a type of "suction and lift" pump. Do not confuse this type with what is known as the "suction and force pump," though the results are almost the same. Turn to Fig. 4, the water is on an upward motion and is being both drawn up from the well or cistern and lifted to some higher elevation at the same stroke. It is usually the best practice to prime this pump when starting. A few strokes will exhaust the air out of the suction pipe and cylinder, particularly if a foot valve is first placed at the end of the suction pipe. As soon as the air is exhausted, and the cylinder is full of water, the water sucked or drawn up with the upward motion of the piston, and at the same time the water which is above the valve in the piston is lifted up to a point beyond the clack C and at the same time foot valve D and clack B opens, allowing water to enter into the cylinder and suction pipe.

Now turn to Fig. 5, and note that the stroke being made now is downward, the foot valve D and clacks B are closed, while valve A is open. It will be noted that this is merely an operation which places the piston in another position. No water has been delivered by this movement, simply displaced from below the piston and valve A to a higher position in the cylinder, until zero is

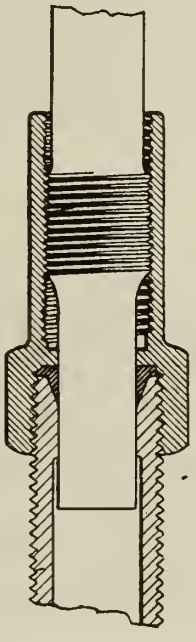
(Continued on page 34)

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reached, as shown in Fig. 5. All the valves are closed, as well as the clacks; the water above the clack C holds it down to its seat, while valves A and D and clack B are merely at rest. The slightest upward stroke of the piston rod will at once close tight the valve A, lift clacks C and B, and water is lifted through the delivery pipe E. In the next issue we will describe the difference between the pump here shown and a suction and force pump, or what is better known as a force and lift pump.

(Continued in next issue).

WHO MANUFACTURES OIL BURNERS?

Editor THE SANITARY ENGINEER:

Do you know if there is a steam or hot water boiler made that will burn kerosene oil as fuel instead of coal, or if there is an attachment for burning oil that can be used with a steam or hot water boiler?

W. J. RYAN,
Sanitary and Heating Engineer
St. John's, Nfld.

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Three-O-System Co., Ltd., 353 Yonge St., Toronto.

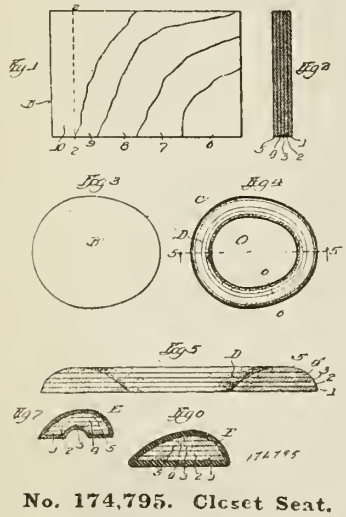
Fess Oil Burners of Canada, Ltd., Royal Bank Building, Toronto.—Editor.

New Patents

No. 174,795.

The Brunswick-Balke-Collender Company of Canada, Limited, Toronto, Ontario, Canada, assignee of Michael James Whelon, Muskegon, Michigan, U.S.A., 30th January, 1917; 6 years. Filed 19th May, 1914. Receipt No. 238,954.

Claim.—1. A water closet seat comprising a wooden core so thoroughly kiln dried as to be devoid of moisture, said core having a pubescent surface, and an exterior veneer of rubber, said veneer being of dense texture and capable of a high surface polish.



No. 174,795. Closet Seat.

2. A water closet seat comprising a wooden core having a pubescent surface, and an exterior veneer of rubber, said veneer being of dense texture and capable of a high surface polish.

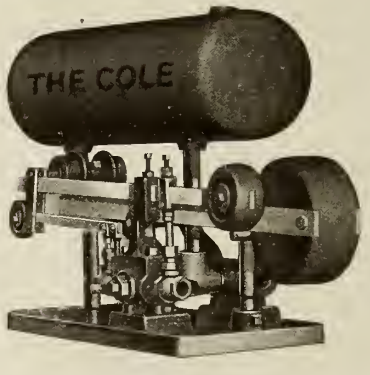
3. A water closet seat comprising a wooden laminated core having a pubescent surface, and an exterior veneer of rubber, said veneer being of dense texture and capable of a high surface polish.

4. A closet seat comprising a wood core consisting of a plurality of thoroughly dried layers of wood veneer arranged one upon the other with the grain of each layer disposed angularly with respect to the grain of the adjacent layer or layers, said layers being cemented together and said core having a rough pubescent surface, and a covering of hard rubber vulcanized on said core and united therewith throughout the entire surface of the core.



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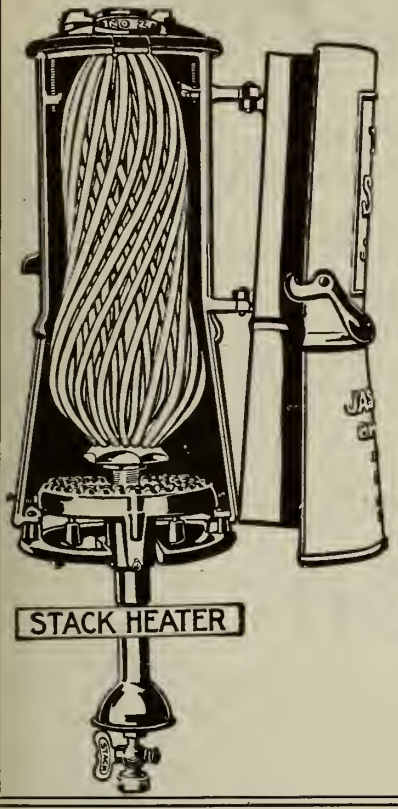
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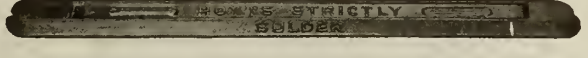
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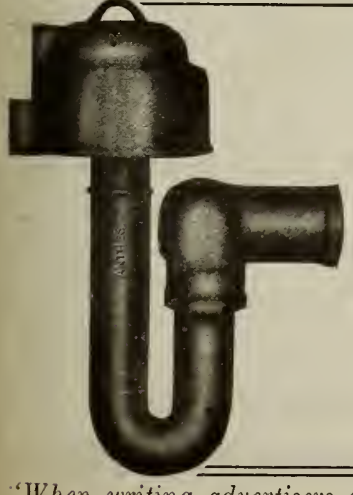


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MacLean's Magazine
FOR JULY

The Smugglers were Caught

THE true and complete story of a huge smuggling conspiracy which robbed the Canadian and United States Customs Departments of hundreds of thousands of dollars, and which was finally exposed by a Canadian Customs officer, is well told in the July MACLEAN'S. The parties concerned settled by handing over a huge check to the Canadian Government and not a word of the story has ever before been in print. The man who writes the article, J. D. Ronald, was personally concerned in the investigation, and he tells the whole case from first to last, merely changing the names of some of the central figures. This is one of the most striking special features that MACLEAN'S has ever had.

Confederation
the dominant theme of July MACLEAN'S

THE Jubilee of Confederation has led the Editor to make the July MACLEAN'S retrospective and interpretive of Confederation in the character of its main contents—this to meet the certain need and desire of the Canadian people. Note the fine provision of special Confederation article and features:

"THE MEETING OF MACDONALD AND BROWN."
By C. W. Jefferys, a frontispiece painted for MACLEAN'S.

'THE STORY OF CONFEDERATION."
By Thomas Bertram. A colorful narrative of the bringing about of the union of provinces.

"FIFTY YEARS OF BUSINESS EXPANSION."
By W. A. Craick, covering all phases of business—banking, insurance, manufacturing, agriculture, transportation, etc.

"THE BUILDING OF THE C.P.R."
By C. H. Mackintosh, former Lieutenant-Governor of the North West Territories, and an ex-editor of the Ottawa Citizen.

"CONFEDERATION AND AFTERWARDS."
By Agnes C. Laut. An article on Confederation and the taking over of the North West Territories from the Hudson Bay Company.

"SOME CANADIAN CONTRASTS."
By Frank Yeigh. A sketchy article showing some of the most picturesque ways in which Canada has advanced during the last fifteen years.



Look for this symbolic cover design in three colors at book stores and news-stands. It is a fine bit of work, and worth preserving.

"THE DRAFT."
By A. C. Allenson. A story of the part which Canadians took in the American Civil War.

MESSAGES ON CONFEDERATION
appear from the Premiers of many of the Provinces of Canada.

Billy Sunday Contributes:

"WHAT I THINK OF CANADA."
A brief article in the crisp, epigrammatical style of the famous evangelist, illustrated by some of his most recent photographs taken in action in New York.

The Fiction Features:

"THE GUN BRAND."
By James B. Hendryx. An interesting instalment of this exciting serial.

"THE OUTLAW BOAR."
By Clark E. Locke. A short story.

"PUTTING IT OVER."
By Hastings Webling. A golf story.

"THE CAPTAIN OF THE SUSAN DREW."
By Jack London. The first instalment of a two-part story—one of the last that London wrote.

The Best Number of MACLEAN'S

THAT has ever been put out is this July issue. It will be bigger, the articles are by long odds stronger, the stories more entertaining, and the illustrations more varied. Stephen Leacock's "Sunshine in Mariposa" is continued in this issue; also the regular Departments, Records of Success, Review of Reviews, The Business Outlook, and Information for Investors.

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Occasionally advertisements are inserted in the paper after this page has gone to press. The insertion of the Advertiser's name on this page is not part of the advertising order, but is inserted solely for the convenience of the reader of the paper

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Dart Union Co., Ltd., Toronto.
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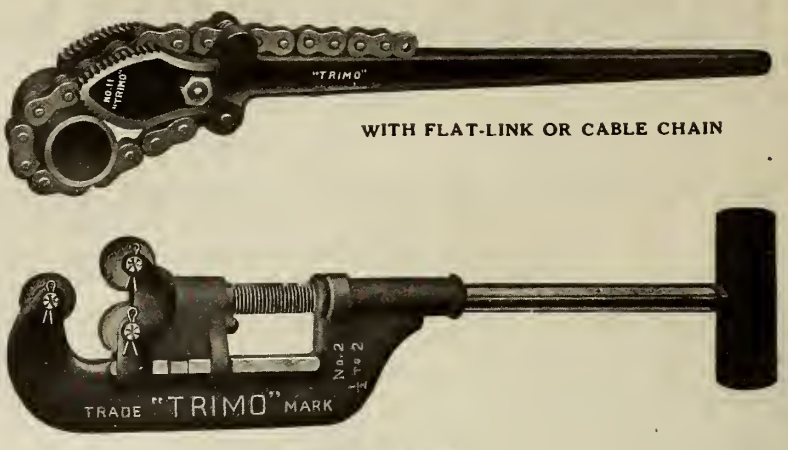
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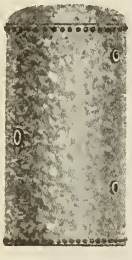


TOOLS

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A Word To The Wise

The American Range Boiler Manufacturers' Association have provided the following regulation governing the sale of range boilers:

"GUARANTEES ARE AGAINST DEFECTS IN MATERIAL OR WORKMANSHIP, AND ARE GOOD UP TO THE TIME OF INSTALLATION AND TEST ONLY. A RANGE BOILER THAT IS TIGHT AT THE TIME OF THE INITIAL TEST WILL BE TIGHT FOR MANY YEARS, UNLESS SUBJECTED TO SOME EXTRAORDINARY CONDITIONS OF WATER OR PRESSURE FOR WHICH THE MANUFACTURER IS NOT RESPONSIBLE."

TORONTO HARDWARE MFG. CO., Limited

Manufacturers of Range Boilers, and Soil Pipe and Fittings

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You take no chances when you specify

KING Hot Water Boilers and Radiators

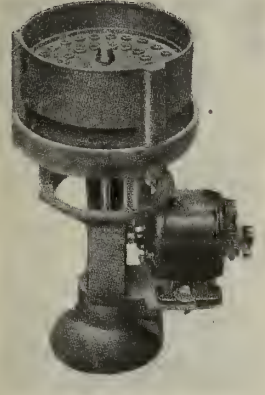


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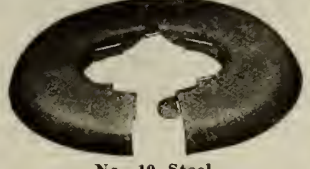
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3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

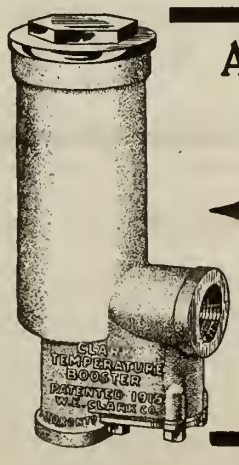
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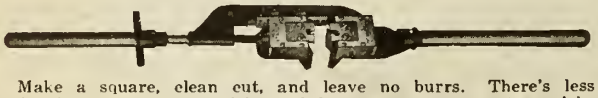
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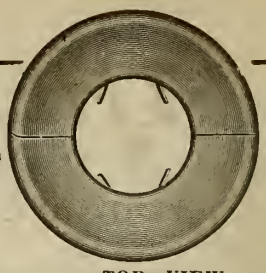
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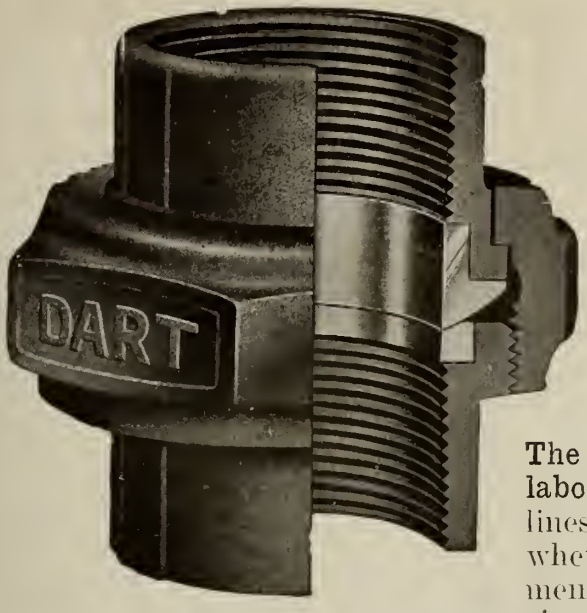
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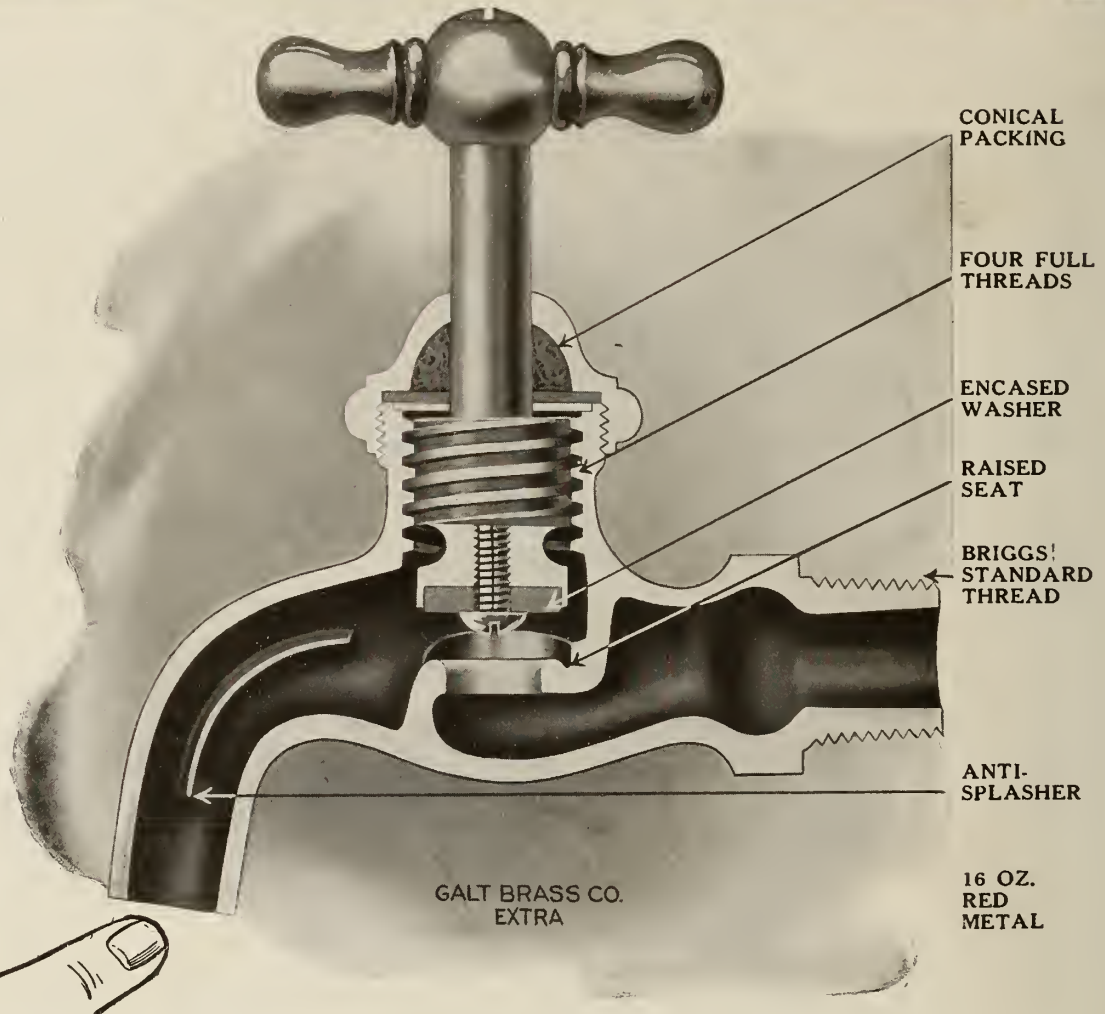
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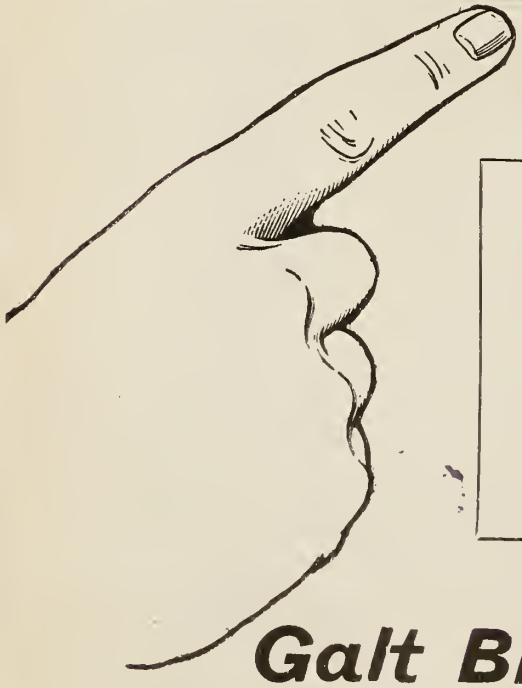
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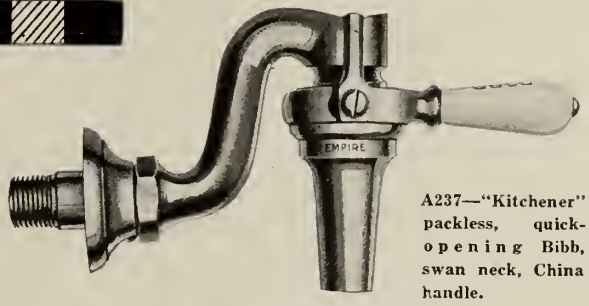
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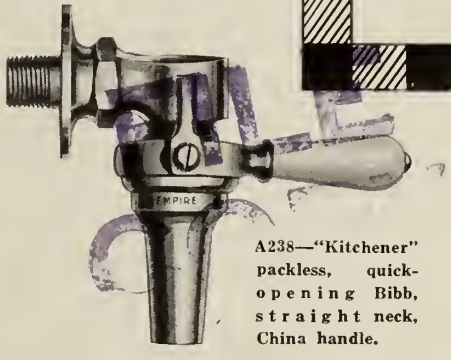
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Vol. XI | Publication Office: TORONTO, JULY 2, 1917 | No. 13

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A237—"Kitchener" packless, quick-opening Bibb, swan neck, China handle.



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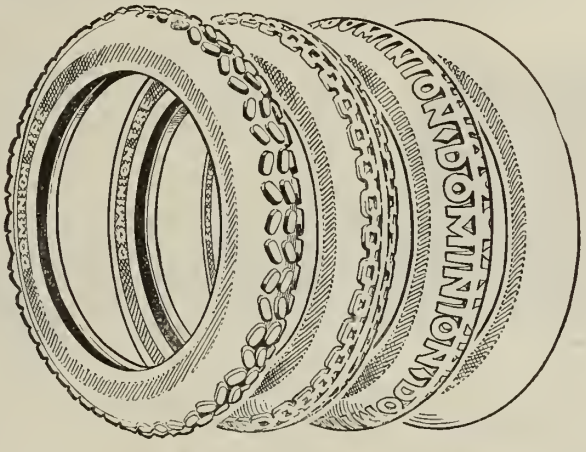
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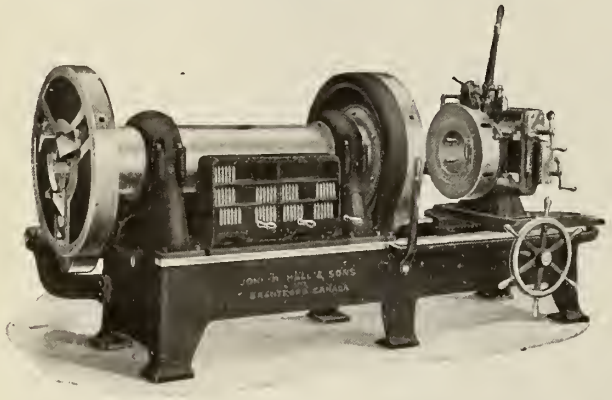
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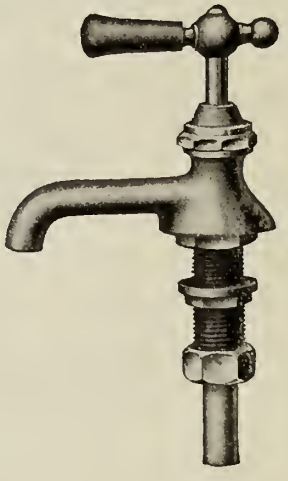
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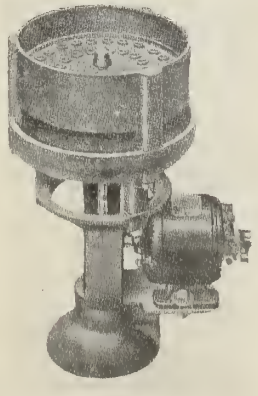
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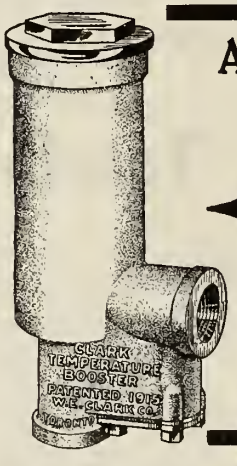
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We have a plan of service which is appealing very strongly to all heating contractors. Have you taken advantage of it?

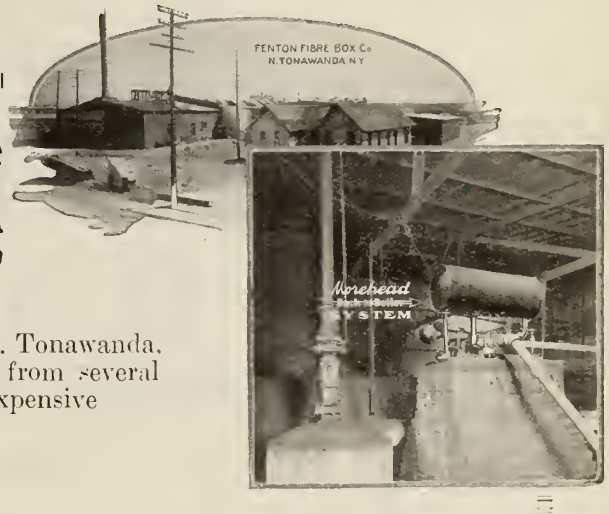
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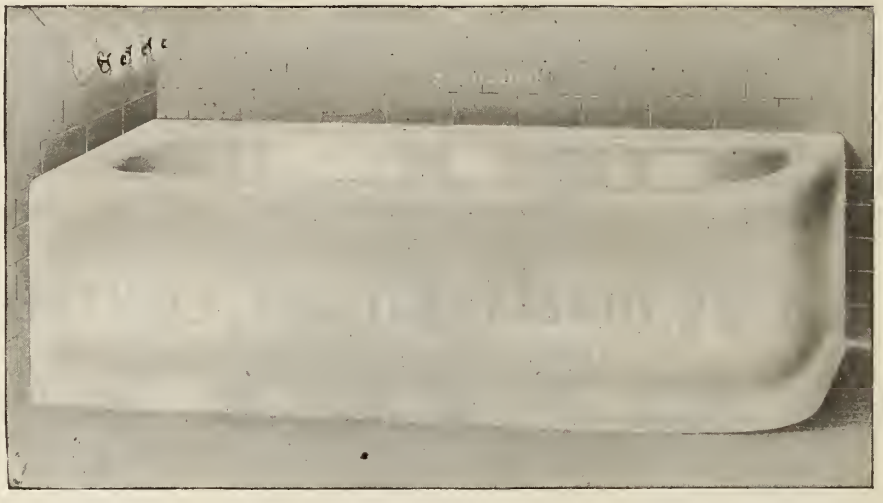
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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, JULY 2, 1917 No. 13

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Apprenticeship Question—The Main House Trap and Breather—Fifty Years of Progress—Canada—An Important Meeting.

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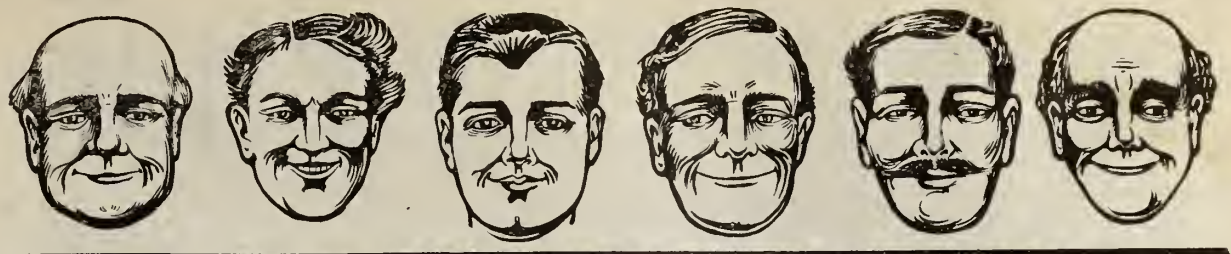
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THE SANITARY ENGINEER

VOL. XI JULY 2, 1917 No. 13

A Sanitary Engineer Sells Windmills

A Reader of the Sanitary Engineer Relates How He Developed a Fine Business in Windmills—Believes in the Old Adage, "Nothing Succeeds Like Success."

WHEN we hear of some one in the plumbing business taking up another line, or rather adopting some new line to his plumbing business and making good at it, we feel that the story is worth telling in THE SANITARY ENGINEER. Here is a case in which the specialty was windmills, and the story is wound round the person of Mr. N. C. Bellerby, Shelburne, Ontario.

One of the representatives of THE SANITARY ENGINEER recently called upon Mr. Bellerby and found him as busy as could be, doing a regular business and with no great amount of effort. Of course this does not by any means infer that he has not put in many hard, long hours in the days gone by.

When inquiring further about the plan he employed to procure such a nice volume of business. Mr. Bellerby replied: "Well, I began to take an interest in pumps and windmills in the year 1898 with my father, who had been working at this line for over 25 years. In 1905 I bought out his business and have been in it ever since on my own account. As to the course I followed in going after business I believe it would be nearer the mark if I said it 'comes after me.' I am, however, a firm believer in the phrase 'Nothing succeeds like success,' because, when I bought out this business in 1905, my average sales of windmills were six or eight each year. Almost the first thing I did was to buy and fit up a sample in my shop, so as to demonstrate in a practical manner all about the machine. Having described the working parts, etc., I then took up the question of the saving of time that could be effected. I found from practical experience that it would require a man one hour per day to pump by hand sufficient water for the average farm home water supply. One hour per day at 20 cents per hour figures out at about $73 a year, and $73 will pay a lot of interest at 6 per cent. In fact the outlay for the line of windmills I handle averages about $75, and this means an interest charge at 6 per cent. of about $4.50. So that it is at once proved to my customers how unprofitable it is to waste time and energy costing 20 cents per hour when the same service, or better, could be had for less than 2 cents per hour."

These arguments remind us of the story told about the Jew's son who left his father's home to work in New York. He got a fine job, said he earned big pay, etc., and wrote glowing letters home. Coming home on a visit, dressed to "kill," he created quite a sensation by his improved appearance and, altogether, looked as if he had "money to burn." His old dad got him to one side and said: "Vell, my son, how much money vas you haf in der pank?" He replied that he "vas dress vell, eat vell, go to der shows and haf a big goot time, and coudt nod safe much money." The old dad then said: "I say, my son, you earn big pay, you liff like de big man, but its nod whadt you earn vat makes you ridtch, it vat you save."



View of shipment of windmills just received by this progressive Sanitary Engineer.

No doubt sanitary and heating engineers would do well if they would preach the gospel of that old Jew, as well as conduct their business so that at a later day they would have the business coming to them like our friend at Shelburne.

Mr. Bellerby stated, too, that one of the secrets of his success has been that of having confidence in the goods he sells, no matter what line is handled, if they live up to the claims made and prove a sound investment.

Steam Condensation Valuable--Why?

What it is and Why We Need it—Correct Methods of Handling and Utilizing Steam Condensation — Showing That to Allow Natural Law Full Sway, the Problems Confronted May Easily be Remedied.

By Wm. H. Rose, of R. E. Cleaton & Co., Engineers, Montreal and Toronto.

We will now connect our condensation pipe to this tank on one side, inserting a swing check valve as it enters, calling this the inlet valve. The check valve opens towards the tank under the pressure of the moving condensation.

From the other side of the tank we will take a pipe leading to the boilers connecting this pipe to the feed inlet of the boilers, also inserting a swing check valve opening to the boiler. This we will call the outlet valve.

We will also connect a steam pipe from the steam space of the boiler to the top of our tank, above the water. In this line we will insert an automatic valve, so fixed that when the tank is horizontal, the valve is closed, and when the tank falls forward the valve is open. This pipe we will call the equalizing pipe.

We are now ready to see what happens when we open the steam main to our heater, and the water of the condensation comes rushing to our tank.

It is evident that the pressure behind the condensation will open the check valve into the tank, as there is no resistance opposed to it. It will not however, open the check valve into the boilers, as the pressure opposed to it here, is in excess of the pressure driving the condensate forward. The natural course for the water to take is into the tank, as this offers the least resistance to the flow.

As soon as sufficient water enters the tank to overcome the balance weight, the tank falls forward, and as it falls it operates the automatic valve on the equalizing steam line, thus admitting steam at boiler pressure to the surface of the water in the tank.

This pressure being greater than the pressure behind the condensate causes the inlet valve to close, preventing any-more water entering the tank. The out-let valve will now open allowing the water in the tank to flow to the boilers. This is due to the fact that, as before stated a column of water, one foot high will exert a pressure of half pound per square inch. As the water in the tank stands four feet higher than the water in the boilers, this column gives us at least two pounds excess pressure, and this pressure added to the boiler pressure on top of the water in the tank makes a greater pressure than that in the boilers. Consequently the valve opens, and the water leaves the tank.

When the water leaves the tank the balance weight brings it back to the horizontal position, cuts off the equalizing pipe, the air-valve opens and the operation is repeated over again as long as condensation forms in our heating system.

That this is so can be readily proved by the following experiment. Go to the water column of your boilers. The water in the glass shows at the level of the water in the boilers. Close the steam valve in the equalizing pipe on top of the column. The water goes up in the glass, out of sight. (This is similar to the action of the water in our tank.) Now, open the steam valve on top of the column. See how the water drops down in the glass and comes to rest at the water line.

Why did this happen? Simply because we have equalized the pressures above and below the water in our column. This is just what happens in our tank. We merely equalize the pressure in both tank and boiler. This is a simple method of feeding condensate into boilers, is it not?

This is an example of applying natural laws to our problem. Gravity does the work and does it positively. We do not have to guess that the water is going into the boilers. We know it is, because we see the tank return to the horizontal position when the water leaves it.

Instead of using up 120 pounds of steam in doing a h.p. work we may assume that no steam whatever is required to feed condensate into boilers in this manner, because all the heat of the steam which we employed to equalize the pressures, goes into the water itself, and thus back again to the boilers, in the shape of hotter feed water.

All this is by way of explaining the action of a simple automatic boiler feed apparatus as shown in the illustrations.

The present day automatic boiler feeder is not an experiment having long since passed the experimental stage, and as turned out to-day embodies the results of 25 years of experiment and observation, and includes all such refinements and improvements, as tend to durability and simplicity.

Gauge Press. in lbs. per Square Inch.	Temperature in degrees F.	Total heat in Heat Units from water at 32 degrees F.	Heat of Vaporization in Heat Units.	Density of weight of 1 Cu. Ft. in Lbs.	Volume of 1 Lb. in Cubic Feet.
0	212	1146	965	.03760	26.60
1	216	1147	962	.0410	24.39
2	219	1148	960	.0434	23.04
3	222	1149	958	.0458	21.83
4	225	1150	956	.0482	20.75
5	227	1151	954	.0506	19.76
10	239	1154	946	.0612	16.32
20	258	1160	932	.0843	11.85
30	273	1165	922	.1070	9.347
40	286	1169	913	.1292	7.736
50	297	1172	905	.1512	6.612
55	302	1174	902	.1621	6.169
60	307	1175	899	.1729	5.784
65	311	1176	895	.1837	5.443
70	315	1178	892	.1945	5.142
75	319	1179	889	.2052	4.873
80	323	1180	886	.2159	4.633
85	327	1181	884	.2265	4.415
90	330	1182	881	.2371	4.218
95	334	1183	879	.2477	4.037
100	337	1184	876	.2583	3.872
105	340	1185	874	.2689	3.720
110	343	1186	871	.2794	3.580
115	346	1187	869	.2898	3.452
120	349	1188	867	.3003	3.330
125	352	1189	865	.3107	3.219
130	355	1190	863	.3212	3.113
135	358	1191	861	.3315	3.017
140	360	1191	859	.3420	2.924
145	363	1192	857	.3524	2.838
150	365	1193	855	.3629	2.756
155	368	1194	853	.3731	2.681
160	370	1195	852	.3835	2.608
165	372	1195	850	.3939	2.539
170	375	1196	848	.4043	2.474
175	377	1197	847	.4147	2.412
180	379	1197	845	.4251	2.353
185	381	1198	843	.4353	2.297
190	383	1199	842	.4455	2.244
195	385	1199	840	.4959	2.193
200	387	1200	839	.4663	2.145

The various parts of this apparatus are marked and indexed for clearness of comprehension.

That this is the apparatus to use in feeding boilers with condensation, if economy of operation is desired, and if reliability of action, together with a minimum of maintenance costs is called for, is abundantly proved by many instances coming under the writer's personal observation and notice.

These examples comprise steam plants used to produce steam for high and low pressure heating in all kinds of industrial process work, such as, soap boiling, starch works, candy factories, steam drying, and in textile plants, such as woolen mills, cotton mills, tanneries, etc.

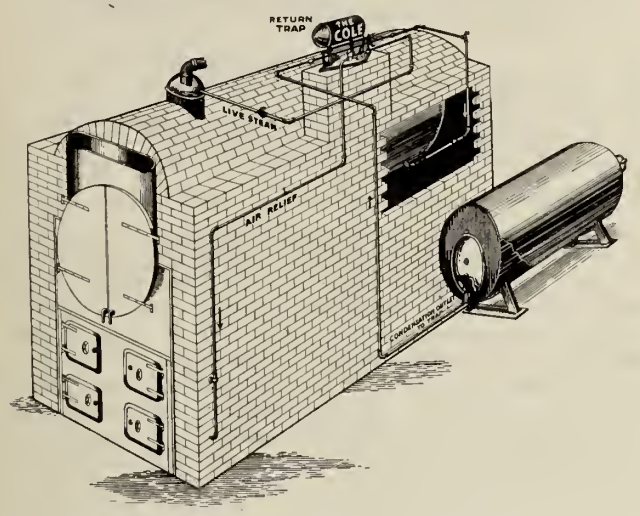
In the lumber and woodworking industries, large volumes of steam are used in dry-kilns, glue pots and driers, bender, etc., and condensation formed in large quantities. These also have come under the writer's notice.

In all the cases noted above the condensation from the heating surfaces has been laid out in the usual "incorrect"

manner, and in all these cases, the condensation system, having been remodelled along correct lines, has shown wonderful results, as far as fuel and water savings are concerned.

An examination of the condition existing, the changes adopted and the results arrived at, in any one plant may be taken as applying in a general way, with slight modifications, subject to local conditions to them all.

Suppose we take for example a candy factory, and in so doing take a specific example, one on which we have



the record of facts and figures, as a matter of fact the writer has actual data covering all these types of plants, and it makes an interesting record.

In this plant the motive power is electrical. The entire output of the boilers goes to furnish heat for cooking, drying, and heating in the factory.

This particular plant required a variety of temperatures, calling for steam at different pressures. The temperatures range from 320° F. down to 215° F. The pressure ranged from 110 pounds down to about 2 pounds in the different departments.

It is proposed to show here how the correct handling of the condensation in the plant enabled the engineer in charge to cut one boiler from a battery of three and using 25 per cent. less coal than before and provide more steam than the factory required, although the finished product was turned out in larger quantities than before.

In the plant there were three return tubular boilers,

Gauge Press lbs. pr Sq. In	Temp. of Steam deg. F.	T. Heat of Steam From 32	H. given up in Cond'g. B. T. U.	Temp. of water deg. F.	Heat in water From 32	B.T.U. req'd to make Cond'n.	steam (from 180) F. pump	Fuel saved in %
0	212.	1146.	966.	212.	180	966	998.	3.4
2	219	1149	960	219	188	961	1001	4.1
5	227	1151	954	227	196	955	1003	5.0
10	240	1155	946	240	208	947	1007	6.3
15	250	1158	939	250	218	940	1018	7.6
20	258	1160	932	258	227	933	1012	8.4
25	267	1163	927	267	235	928	1015	9.3
30	274	1165	922	274	242	923	1017	10.2
40	286	1170	913	286	256	914	1022	10.3
50	297	1172	905	297	266	906	1024	11.9
75	320	1179	890	320	288	891	1031	13.2
80	323	1181	887	323	293	888	1033	15.7
90	331	1183	881	331	301	882	1035	16.4
100	338	1185	876	338	308	877	1037	17.4
110	344	1187	871	344	315	872	1039	18.3
120	350	1188	867	350	320	868	1040	19.0
125	353	1189	865	353	323	866	1041	20.0
140	360	1192	860	360	332	860	1044	20.4
150	366	1193	856	366	337	856	1045	21.5
200	388	1200	840	388	361	840	1052	22.5

of a rated capacity of 150 H.P. each, all burning coal and carrying a steam pressure of 115 pounds.

The steam was piped direct from the boilers to the various kettles, dryers, coils, etc. It was subject to hand control by the operatives who were using the steam.

After the steam had passed through these kettles, etc., the condensate was drained through a variety of "so-called" steam traps of different kinds, thermostatic, float, and bucket traps being employed for the purpose.

All these traps discharged through the return lines into an open receiver in the boiler room, and from this receiver the water of condensation was pumped into the boilers by a duplex steam pump of the ordinary type.

This is the common practice, in this class of factory, and both the engineer and the management thought they had a good, efficient steam plant. But had they?

Could they not improve this plant to a great extent? They certainly could and did, and this is how it was done. Perhaps the readers' plant is open to similar improvements. Let us see, then, what they did here.

When the writer was requested to look over this plant, here are the conditions as he found them:

The open receiver had a vent pipe discharging into the air, and this vent pipe gave out a very considerable amount of steam and vapor at all times. To kill this steam and vapor the firemen kept a steady stream of cold water running into the receiver, because, as they said, "The water got too hot to pump. The pump won't work with hot water. Now this was correct, as "no pump will pump steam," so this shows a double waste, waste of heat and water, as the cooling water provided a surplus over that required to feed the boilers, and it of necessity overflowed to the drains, carrying with it the heat of that water it cooled.

The average temperature of the feed water as fed to the boilers was about 170° F. to about 180° F. An examination showed the temperature was around 212 F., so here was a direct to boiler feed loss of 37 degrees between the receiver and the boilers. This was an avoidable loss.

The loss of water by actual measured count was about 6.5 gallons per minute, and this loss was continuous while the boilers were in operation. It represented a yearly water loss equal to more than a million gallons. This also was an avoidable loss.

As this water came from the city mains at a temperature of about 45 F. and passed into the drains at a temperature of about 175 F., it carried awaw with it heat to the extent of 8,500 B.T.U. per minute, about the total available heat of one pound of good coal. One pound of coal per minute, 60 pounds per hour, 600 pounds per day of ten hours. Another avoidable loss.

The feed pump was running continuously, and as the average steam consumption of this type of pump is about 3 per cent. of the boiler power, the pump was taking about 400 pounds of steam per hour. With an evaporation rate of 4 pounds of coal per H.P. hour, this represents about 54 pounds of coal per hour, or 540 pounds per day. Another avoidable loss.

As the steam was conducted to the boiling units at a pressure of 110 pounds and there condensed, it follows that as the pressure is 100 pounds the temperature at which condensation occurs is 338 F., so when the condensation was allowed to cool down to 175 F. before entering the boilers, it lost heat to the extent of 163 B.T.U. per pound of condensate, approximately 16 per cent. of the heat which went to make the steam.

This is not merely guess work. We know that it is so, because every 10 degrees of heat we add to feed water reduces the fuel by 1 per cent. Here again was another avoidable loss.

The amount of vapor which was lost through the main vent pipe of the receiver and various other smaller ones could not be determined, but that it was considerable was determined later on.

We can see that the total of these avoidable losses amounted in the aggregate to a very large percentage of the total fuel cost of making steam in this plant.

The means suggested to the writer to recover these losses were simple, and merely covered the proper method of handling condensate from the units, and were to the following effect:

To separate the different units into groups according to the temperatures required. Take the steam from the

boilers direct to those requiring the highest temperatures. After passing through these units take the return condensate through common swing check valves direct to a closed receiver, cutting out the float traps. (The check valves are merely to prevent short circuiting.)

To drain this closed receiver from the bottom, run the drain pipe direct to the boilers, feeding the water into the boilers through a direct boiler feeder. This water should feed into the boilers at a temperature of at least 300° F.

As the condensate from the high pressure units flows into this receiver, the pressure is reduced, and some of the water flashes into steam again, owing to this reduction, which is due to expansion. The remainder flows by gravity to the boiler feeder.

The steam thus separated from the water is now taken through a vent pipe at the top of the receiver and is piped to those units requiring a lower pressure and temperature, and is there used over again.

MAXIMS FOR BOILER-ROOM ECONOMY.

A.B.T.U. is a small thing, but B.T.U.'s cost money—save them.

Water costs you money—save the water.

Your leaks waste your steam—stop your leaks.

Hot water makes cheaper steam than cold water—save the hot water.

Your pump costs you money—stop the pump—you don't need it.

A boiler has all the work it can do under the best of conditions—feed it with HOT water.

Varying temperatures injure your boiler—save the repair bills.

Burn as much coal as you can—BUT—don't waste the coal.

A HOT boiler steams quicker than a cold one.

CONDENSATION is hot—Feed water is generally cold. (Comparatively.)

To understand the utility of this change, let us bear in mind the following facts: You will note, as originally laid out, the steam passed into the units and was there condensed, but was held in check by the float traps, which interrupted the flow of the steam through these units.

A moment's consideration of a simple experiment will show how this condition tended to reduce the efficiency of these units, and we will see how the substitution of ordinary check valves in the return lines helped the operation of the kettles.

If you take a steam radiator and admit steam at one end of it, and from the other end of it take a return pipe and provide a globe valve in this pipe, open up the valve on the return line wide, then admit steam to the radiator, the whole surface of the radiator will quickly become hot.

Now close the return valve and see what happens. The radiator will immediately become cooler, and will fill with water of condensation. The parts which are water-logged will not transmit the heat the surface did before, and for this reason:

As the circulation is interrupted your steam ceases to flow, condensation continues, the condensate moistens the surface of the radiator, and this film of moisture retards the flow of heat through the surfaces.

Open up your return valve again and notice how quickly the live steam circulation heats up the surfaces, as compared with the dead steam at rest in the radiator.

Try this experiment, and you will soon be convinced of the fact, that rapid circulation of steam is what counts in the transmission of heat. You will also learn from your observations why any interruption of the circulation is undesirable.

This is just what happened when the returns were trapped. By cutting out the traps and piping these returns direct to the receiver, a rapid flow of steam was established through the cookers supplied, and no interruption of circulation occurred (the check valves merely prevented short-circuiting through the units).

As the receiver was of good dimensions, the return condensate passing into it had opportunity to expand, and this resulted in a pressure drop. This drop being constant, the steam of course flowed to this point, sweeping the condensate before it, and the radiation of the tank induced further condensation. This resulted in a perfect natural circulation of the steam.

Now then, we have this condition set up: A straight, uninterrupted flow of steam to and through the cooking units to the "flash" tank or receiver. In the receiver a separation of water and steam. Water drained by gravity from this tank back to the boilers. Separated steam available for re-use at a lower pressure and in comparatively dry condition.

This steam was piped to the units requiring the next lowest pressure, passed through them and back again to another "flash" tank, or receiver. It was once more separated here, drained back to the boilers again and the "separated" steam carried over to the units requiring a still lower temperature, and finally separated in a tilting steam trap of the "vacuum" type, from which the condensate was discharged into the boilers through the direct boiler-feeder.

EXAMPLES SHOWING USE OF STEAM TABLE.

With steam at sixty lbs. pressure (gauge), heating up 200 gals. of water per hr. from a temperature of 50 deg. F. to a temperature of 180 deg. F. How many lbs. of steam condensed per hour?

One gal. of water weighs 10 lbs.—the total weight of water is 2,000 lbs.

The temp. raise is (180 — 50) 130 deg. F.

The B.T.U. required = 2,000 lbs. x 130 deg., or a total of 260,000 B.T.U.

One lb. of steam at 60 lbs. pressure (see table) contains 896 B.T.U.'s as latent heat. In condensing to water it gives up this heat.

By dividing this heat into the heat required $\frac{(260000)}{896}$ we find that 290 lbs. of steam condensed will do the work.

For the amount of heating surface required to condense this volume of steam (see condensation chart, page). Divide the lbs. of steam x 2 and multiply H.S. x gauge.

AVERAGE HEATING VALUES OF FUELS.

Nat. gas average B.T.U. per C. ft.	Approx. 850
Coal gas average B.T.U. per C. ft.	630
Petroleum oils average B.T.U. per lb.	27,000
Kiln dried lumber average B.T.U. per lb.	8,000
Sawdust and shavings (dry) B.T.U. per lb.	10,000
Coke per lb	13,500
Soft coal per lb.	12,000
Hard coal per lb.	14,500
A cubic foot of hard coal weighs	50 lbs.
A cubic foot of soft coal weighs	40 lbs.
A cubic foot of coke weighs	28 lbs.

A boiler H.P. (standard) = 30 lbs. of water evaporated into steam. F.W. temp.—100 F. steam press—70 lbs.

(Actually a B.H.P. is the hourly transmission of 33,400 B.T.U.)

The average boiler efficiency is about 60-65 per cent.

With this efficiency o boiler will develop a H.P. on the following fuel consumption (approximate):

$\frac{\text{Heat in fuel x } 65\%}{1000 \text{ B.T.U.}}$ Equals lbs. of evaporation.

$\frac{\text{Lbs. of evap.}}{30}$ Equals lbs. fuel per H.P. hour.

Standard fuel consumption per H.P hour = 4 lbs.

Reviewing the foregoing, we see an example of economical handling of steam condensation, whereby the whole of the heat in the steam was usefully employed. This system did not allow of any wasted heat between the steam escaping from the boilers and the condensation returning back again to the boilers.

As we have seen, the condensing point of the steam into water corresponds with the temperature at which the water turns into steam. The proper thing to do with the condensate is to put it back into the boilers at this temperature, without allowing it to cool down and lose heat.

That this is the proper thing to do, we can see from

the results obtained in this plant. These results are positive, admitting of neither doubt nor argument. They may be demonstrated in any plant using steam and producing condensation.

That the results obtained were worth while is indicated by the fact that there was a saving of about 1,100,000 gallons of water per year, and about 1,000 tons of coal saved.

There was also a very marked increase in the quantity of material turned out, and a big reduction in the time taken to complete the cooking process. There was also of course a reduction of labor in the boiler room, owing to two boilers only being applied.

Ignoring completely the increased output efficiency and the reduced cost of labor, and merely taking the actual "dollar and cents" savings in coal and water, we find that the cost of correct methods of handling condensation in this plant was in the nature of a "gilt edged" investment.

The total cost of the installation of the entire apparatus, which consisted of the automatic boiler feeders, the "flash" tanks, and the vacuum tilting trap, complete with all pipe, fittings, valves and labor, was just about $1,000.

The water and fuel saving, taking water at 10c per 1,000 gallons, and coal at $4.00 per ton, amounted to the respectable sum of $2,369.00.

This shows a return equal to ten per cent. per annum on a capital investment of $23,600. Or, in other words, it is equal to a return of 236 per cent. per annum on the money invested. Surely a good enough investment for any plant owner to make.

Let us see how it was possible to save this money by attention to the condensation. In this plant we did not have the proper facilities to determine the definite proportions of the boiler power, which was absorbed by the different departments using steam at the different pressures, so the writer is unable to give exact figures.

In figuring out the sizes and capacities of the different boiler feeders to be employed, we approximated them as follows:

The main boiler feeder had to have a capacity equal to the total H.P. developed at the boilers, with a 50 per cent. reserve capacity. The high pressure cooking units we figured at about half the boiler power. The intermediate pressures we took to be about 30 per cent. of the boiler power. The remaining 20 per cent. we apportioned to the extreme low pressure work.

Taking this basis to work on, we can approximate the losses and the savings resulting from the changes.

The boilers develop 450 H.P., and at 30 pounds of water per H.P. hr. this is 13,500 pounds of water evaporated per hour. The pressure carried is 115 pounds, gauge. The temperature of evaporation or boiling is 347 F. The latent heat of evaporation is 869 B.T.U. The total heat of the steam is 1,187 B.T.U. The boilers were fed at a temperature of 175 F.

Under these conditions to evaporate a pound of feed water into steam at the pressure requires a heat exchange from the coal to the water equal to the difference between the heat in the water and the total heat in the steam. A total heat exchange of 1,045 B.T.U.

EXAMPLES SHOWING USE OF THE TABLES.

There are 20,000 feet of inch and a quarter pipe in a dry kiln using exhauss steam at 2 lbs. back pressure. How many lbs. of steam condensed per hour, and to be removed?

Table No. 1 shows that 2.3 feet of 1¼" pipe equals 1 sq. ft.

therefore $\frac{20000}{2.3} \times 6 = 8700$ sq. ft.

One square foot condenses half a pound of steam, therefore

$\frac{8700}{\frac{1}{2}} = 4350$ pounds of condensation per hour.

Adding 25% for condensation in mains, etc., 4350 x 25% = 1087.

Therefore, total condensation to provide for amounts to 4350 lbs. in coils, and 1087 in mains, etc., or 5437 lbs. in all.

Perhaps having found this we wish to reduce our heating surface to a basis of one-inch pipe. Therefore, as 3 ft. of 1-in. pipe equals one sq. ft. and our total sq. ft. is 8700 plus 25%, or 10875 in all, we have 10875 x 3 = 32625 ft. of 1-in. pipe.

Nearly all trap manufacturers base their trap capacities on lineal ft. of 1-in. pipe.

The same calculations would apply equally to ordinary low pressure heating work, but instead of dividing the total sq. ft. by ½ it should be divided by ¼, as ordinary heating condenses ¼ lbs. per sq. ft. per hour.

Here the amount would be 2718 lbs. per hour.

PIPE SIZES IN RELATION TO SQUARE FEET OF HEATING SURFACE.

2.9 ft. of 1-inch pipe equals 1 sq. ft. heating surface.
2.3 ft. of 1¼-inch pipe equals 1 sq. ft. heating surface.
2.0 ft. of 1½-inch pipe equals 1 sq. ft. heating surface.
1.61 ft. of 2-inch pipe equals 1 sq. ft. heating surface.

To reduce pipes of various diameters to their equivalent in sq. feet of heating surface, multiply the length of pipe by figures in first column.

To compute equivalent in 1-inch pipe of any quantity of pipe of larger diameter, use the following table:

Size of pipe—1¼, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 6, 7, 8.
Equivalent of 1-in. pipe in 1 ft. of—1.26, 1.4, 1.8, 2.2, 2.6, 3.0, 3.4, 3.8, 4.2, 5.0, 5.8, 6.5.

In ordinary calculations fifigure 3 1-in. ft. 1-inch pipe as equal to 1 sq. ft. of heating surface.

In ordinary low pressure heating calculations figure that one sq. ft. of heating surface will condense a ¼ lb. of steam.

In dry kilns or similar work under average conditions a sq. ft. of heating surface will condense ½ a lb. of steam.

Always figure in the mains and branches as heating surface. Generally 25% of the total surface will cover this item.

A simple rule to calculate the flow of steam through pipes is $\frac{P \times A}{70}$ = lbs. of steam per second.

P. being the absolute pressure (or gage press + 14.7 lbs.).
A being the area of pipe in square inches.

A sq. ft. of ordinary direct radiation will transmit 1.6 B.T.U. per hour for each deg. temp. difference.

Example—

Steam at 2-lb. gage—temp. = 219° F.
Secondary air ..... 70° F.

Temperature difference . 149° F.

Temp. difference 149x1.6 = 238 B.T.U.

With a pound of coal yielding 14,500 B.T.U. as the heat of combustion, and the boilers having efficiency of 65 per cent., each pound of coal burned would transmit to the water in the boilers about 9,400 B.T.U. available to make steam.

It can be seen thus, that each pound of coal burned would evaporate 9 pounds of water $\frac{9400}{1045}$. This we will take as the evaporation of the boilers under the conditions in the plant.

Under the new conditions, about 50 per cent. of the evaporation, when condensed, passed straight back to the boilers at the average temperature of 324 F.

The heat in the water at this temperature, 292 B.T.U. Therefore to evaporate this water into steam at 115 pounds pressure requires a heat exchange of 895 B.T.U. per pound, the difference between the heat in the water and the total heat in the steam. A saving of heat of 150 B.T.U. per pound, just 15 per cent. of the heat required under the first conditions.

About 30 per cent. of the boiler power was used at an average pressure of 60 pounds. The condensate from this steam was delivered to the boiler direct at a temperature of 300 degrees with a loss of only 7 B.T.U. per pound.

The total heat in the water at this temperature is 268 B.T.U., therefore this required a heat exchange equal to 919 B.T.U. per pound of water, as against 1,045 B.T.U. formerly required. This is a saving of 126 B.T.U. per pound, or 12 per cent. of the heat required in making steam, before the change.

(Continued in next issue)

Rural Sanitation

A Continuation of the Sanitary Science Course That Has Been Appearing in the Sanitary Engineer, But Having Particular Reference to the Sanitary Disposal of Household Wastes in Unsewered Districts.

Written Specially for The Sanitary Engineer by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 24

ROOF SLABS FOR SEWAGE TANKS

IN the last article methods of making forms and of placing concrete in tank roofs were given. There is always experienced certain difficulty in making these forms and of subsequently taking such roof forms down and getting them out through the manhole, especially in shallow tanks. As a matter of fact, the "manhole" in a shallow tank becomes only a "handhole," for there is not sufficient head room for a man to work inside such a tank.

Fig. 1 shows tanks with properly constructed manholes, but such construction adds materially to the cost of small tanks. Also it is not always practicable nor desirable to have the level of the liquid, and consequently the outlet from the tanks, so far below the surface of the ground.

In Fig. 2, the septic tank is of sufficient depth to allow one to work inside, and in the dosing tank the manhole cover is placed for convenience just above the syphon. This particular plant is advised by the California State Board of Health.

To allow of easy access to all parts of the usual shallow tank for cleaning and especially for occasional examination of the syphon (the compartment containing which generally has less depth than the settling compartment), roofs of removable two-inch plank are frequently used. They are easily moved, a plank of soft wood one foot wide and two inches thick weighing about five pounds per foot of length. For a tank four feet in width, such a plank would safely stand a load of 1,000 to 1,500 pounds, if it be evenly distributed, or of 500 to 750 pounds, depending on the kind of timber used, if it all comes at the middle, as when a cart wheel passes over the tank. For comparison, if the tank were only two feet wide, but had also a twelve inch covering of earth, each plank should carry a load of about one ton distributed or one-half ton if applied all at one point. A plank roof is therefore usually sufficiently strong as well as easily removed. The objection, of course, is that it is not a permanent form of construction. But where sewers are expected in a community in a few years, a two-inch plank roof is probably the cheapest and most convenient construction.

Instead of plank there may be used permanent roof slabs (see Fig. 4), of natural stone, but more generally such slabs are of artificial stone—concrete — and most frequently with metal reinforcement.

Such roof slabs for easy handling should be as light as is consistent with strength. The wider the tank not only the greater the weight of a slab, due to the fact that it is longer, but as the length of the slab increases so must the thickness if it is to carry an equal load. Therefore, as far as roof slabs themselves are concerned, it is desirable to have a tank as narrow as possible. A general rule for septic tanks is that they should have a length at least twice their width to insure a proper flow. It has also been stated that tanks should not be less than three feet in width. Just why, the writer does not know unless there has been considered the difficulty of moving about in a narrow tank if one entered by a manhole. With roof slabs, however, all the tank covering can be removed, if necessary, and two feet seems a sufficient width. In Fig. 2 the tank is shown as only two feet wide, even though there is a "monolithic" (all in one piece) cover; in Fig. 4 the tank shown is only 21 inches wide, but removable slab covers are used.

To make concrete slab covers for a wide tank the following directions have been given:—

"Make a flat box form (see Fig. 3), 5 inches deep inside, 16 to 18 inches wide (according to number of slabs needed for the length of the tank), and long enough to overlap 4 inches on the walls. Mix some cement mortar (1 of cement to 2½ parts of clean mortar sand) or if clean gravel is convenient, with all stones larger than ½ inch sifted out, use concrete mixed 1 part cement, 2 of sand and 2 parts of fine gravel. Place a layer of this mortar or concrete (thoroughly mixed) over the bottom of the box (previously wet), three-quarters of an inch thick. On this lay pieces of iron rods or heavy wire mesh or strips of "expanded metal," bending the ends upwards gradually three or four inches. Then fill up the box with the mortar or concrete gently tamped and trowelled at the edges so as to make smooth sides and corners. It is well to smear the inside of the box with soap or oil before putting in the

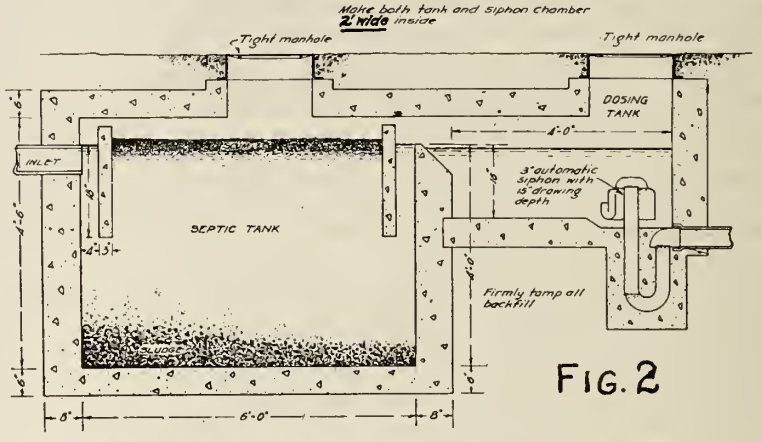


FIG. 2

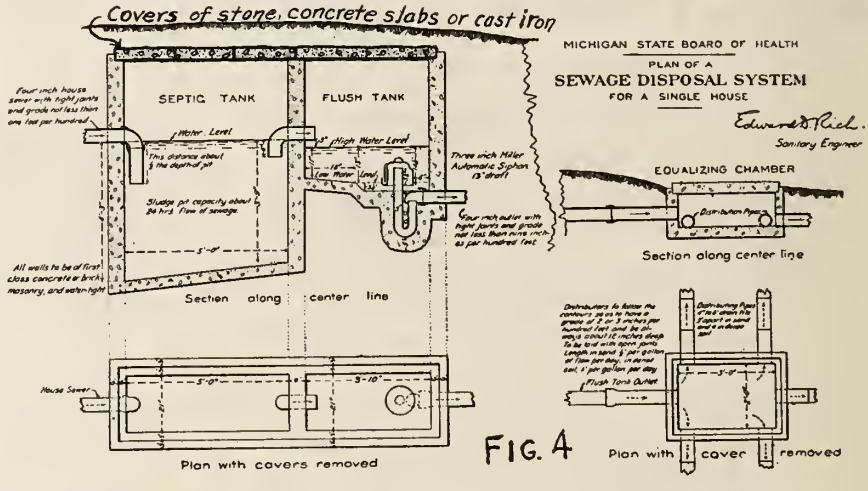
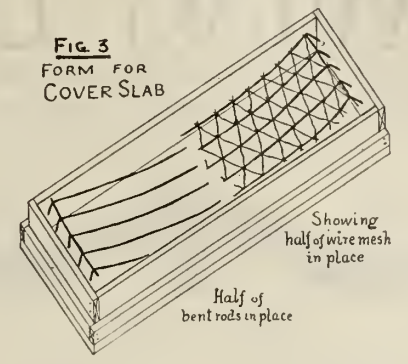


FIG. 4

concrete. Smooth the upper surface of the slab with a broad trowel. Enough metal reinforcement requires about four-tenths to half a square inch of metal to each foot of width of the slab. It is assumed that the clear span of the slabs would be about five feet. For spans of six or more feet they must be made stronger. The 5 inch slabs 17 inches wide would weigh about 420 pounds if five feet long; a 4½ inch slab about 370 pounds. Hence one of these may be removed easily when access to the inside of the tank is desired. Each slab should have about 48 to 60 hours to set before handling it. Then it may be carefully tipped over and the form removed to be used for another slab. If it is not handled gently, it may be cracked and would then be nearly useless."

It will be noted that the slabs described weigh about 400 pounds. Therefore, the statement that a slab is easily removed seems not to be in accord with general experience—try it. To reduce the weight, the slabs could, of course, be made only 12 inches instead of 17 inches wide, but the number of slabs would be considerably increased and extra time would be required in making forms and placing concrete. It would be most convenient, the writer believes, to make slabs 18 inches wide and reduce the width of tanks to 2 feet, if necessary, so that no slab would weigh more than 200 pounds. Table 1 shows what loads can be safely carried with a foot of earth covering the tanks, and with slabs weighing not much more than 200 pounds.

4½ by 2½ feet to be filled by three roof slabs. The form for the roof slabs is made only 2 feet 5¾ inches long, 17 5/16 inches wide at the bottom, and 18 5/16 inches at the top. This arrangement prevents binding of the slabs and yet leaves no open cracks. As explained, a 4-inch roof slab not reinforced, would carry



about 500 pounds; a 3-inch reinforced roof slab would stand about half a ton, or just about twice the amount, while a 4-inch reinforced slab should carry any weight that would probably come on a tank of 2 feet in width.

REGINA TO ADOPT METER SYSTEM FOR WATER SERVICES

A maximum consumption allowance of twenty gallons per room per day on a flat rate basis, coupled with an excess charge at a rate per hundred gallons yet to be fixed for quantities over and above the allowance as shown by the meter, is the system which will be adopted for the sale of water to the citizens when meter reading is put into effect, provided a draft by-law now in course of preparation is approved by the City Council.

Under this system the average consumer will pay the same amount quarterly for his water supply as he is paying at the present time, provided he does not exceed the maximum consumption allowed under the draft by-law. Thus, the occupant of a six-roomed house, who is now paying $4.50 a quarter will continue to pay this amount provided the meter shows that during the quarter he has not used more water than would average 120 gallons a day.

Tests which have been made of the amounts being consumed by the citizens since the meters were installed show that consumption varies widely in houses of about the same size and equipped with the same number of faucets, baths and closets. The readings show that the daily consumption per room ranges from 12 or 15 gallons to as high as 60 gallons, and in some cases even greater than this amount is being used in comparatively small houses.

Margin to Spare for Lawns

Those who are using less than 20 gallons per room per day will have a margin to spare which will enable them to water their lawns without extra cost, while those who are using the larger quantities mentioned are likely to have a spasm when the bill for the first quarter after the meter reading is put into operation is rendered.

It is generally believed that the new system, or any alternative one which the aldermen may decide to adopt, will go into effect on July 1 of this year. It is considered better that the meter system should be put into effect during the summer months than in winter time in view of the fact that under the flat rate many people have been in the habit of allowing their taps to run during the severe weather to prevent freezing. This will prove to be a very costly device for protecting the pipes once the bills are being rendered on the meter basis and it is the opinion that if the system is put into operation during the summer months the citizens will have learned before winter comes that the wastage of water is a costly one with the meter ticking off dollars and cents.

Good Thing for Plumbers

The establishment of the system of billing on meter readings will prove to be a good thing for the plumbers, as after the first quarter has elapsed. if not before, the plumbers will be called upon to remedy a good many defects in a number of the plumbing installations of the city. It is stated that a very large number of closets are leaking and these and other leakages will have to be attended to very promptly if the water account is to be kept down to the minimum.

As an instance of the way in which the cost of a leak will mount up, it is stated that a continual stream of water one-sixteenth of an inch in diameter will cause the loss of 600 gallons in the twenty-four hours, or five times the maximum allowance for a six-roomed house.

It is generally understood that the deposit system as at present in force will be retained, but the question of imposing a service charge similar to the electric light system has not been decided.

Toronto, Ont.—The Polson Iron Works, Ltd., have had plans prepared for a new boiler shop, 250 ft. by 90 ft. wide. It will be of steel and concrete construction. The equipment will be the latest type, and will include an overhead electric travelling crane. The present boiler shop will be overhauled and refitted for an extension to the machine shop and engineering department. A new gantry crane, 65 ft. wide by 50 ft. high, of 10 tons capacity, is being erected on the east side of the dock. Other extensions include a lumber storage and auxiliary store house.

TABLE I.

Concrete slabs, 18 inches wide.

Projecting 3 inches on each side on the tank walls and covered by one foot of earth.

Thickness of Slab	Depth of Tank	Approx. Weight	Plain Concrete Safe Centre Load	Reinforced Concrete Safe Centre Load	Reinforced Concrete Steel Rods Spaced 6 Inches Apart
3 inches	2 feet	135 pounds	245 pounds	1,085 pounds	3—⅜" round rods
"	2½ "	160 "	105 "	775 "	"
"	3 "	190 "	.....	555 "	"
3½ inches	2 feet	160 pounds	400 pounds	1,795 pounds	3—7-16" round rods
"	2½ feet	190 "	225 "	1 335 "	"
4 inches	2 feet	180 pounds	580 pounds	2,680 pounds	3—½" round rods
"	2½ feet	215 "	360 "	2,075 "	"

Concrete can stand a great deal of compression but comparatively little tension. If steel rods or heavy wire netting (or mesh made particularly for such purposes) be placed near the bottom of the slab (say with the centre of steel one inch from bottom), the tension caused by any load on the slab is taken up by the steel. Hence a reinforced slab can carry much more load than a plain concrete slab. From Table 1 it will be seen that a 4-inch plain concrete slab 18 inches wide for a 2 feet span can safely be expected to carry only 580 pounds, as well as one foot of earth cover. If it is reinforced with ½ inch rods spaced 6 inches apart (see Fig. 5) then it will carry a ton and a quarter, over four times as much. More reinforcement than that shown in the table will not increase the strength of the slab.

In Fig. 5 there is shown a settling tank 4½ feet by 2 feet wide. Allowing 3 inches on each side of the tank for overlap of roof slabs there is a space of

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JULY 2, 1917

APPRENTICESHIP QUESTION

THE Apprenticeship and Skilled Employment Association, recently formed in England, has issued certain recommendations dealing with the apprenticeship question which are of far-reaching importance.

They all seem to have been very well thought out. The fixing of the period of apprenticeship at 5 years finds general favor. It has been found that a longer period acts as a deterrent with many parents. It is urged that apprentices should leave school at 15 or 16 years of age; premiums are condemned. It was only natural that the recommendations should include continuation classes during ordinary working hours at which attendance should be compulsory for the first two or three years of the apprentice's time.

The most interesting of the recommendations perhaps is that conversant with wages, etc. It says:

> Wages must vary according to trade and locality, but should not compare so unfavorably with the wages paid to boys in unskilled trades as to deter poor parents from apprenticing their sons on purely financial grounds. Much talent which would have been of the greatest use to the nation has been lost through apprenticeship wages being so low that lads from poor homes, but with marked industrial gifts, have been unable to enter skilled trades. A bonus, payable at intervals, for good time-keeping, behavior and work, is an incentive to the apprentice to do his best.

This apprenticeship question is a big one. It goes to the root of our industrial and commercial affairs, and upon its satisfactory settlement will depend in a large measure whether we shall successfully compete with our rivals after the war. If the question is taken up as it should be as a matter for the state, no doubt much good will result.

Canada will do well to give the matter earnest attention, because we are proving every day that skilled workmen are a country's biggest asset. Look at the plumbing and heating business, what state of affairs exist to-day? Simply that boys start as a general rule to work as helpers in a shop not with a view of learning the trade, but rather using the trade as a means of livelihood. Apprentice's wages are very low in comparison with the wages paid for unskilled labor, and poor parents cannot afford to send their children to learn the trade.

In Toronto we have one of the finest Technical schools to be found on this continent. One is also doing good work in Montreal. Another is under construction in London, Ontario. But in spite of all these and more, the parents of the poorer class cannot afford to send their children to learn a skilled occupation because of the small wages paid in those trades compared with those classes of labor that require less skill.

It is a big question and one which every employer should endeavor to the best of his abilities to grapple with. In the next issue we will publish an article on the work accomplished at the Toronto Technical School since it opened a couple of years ago—that is, in the sanitary and heating department, under the guidance of Mr Jno. E. Fullerton.

THE MAIN HOUSE TRAP AND BREATHER

IN THE next issue we will begin a new series of articles bearing the title above named, we will publish a number of letters which are replies to a number of questions asked, and which letter was reproduced in last issue on page 17. Those who have not filled in the letter and returned it to the editor will greatly oblige by doing so at once. The object in view is, once and for all, to show the craft what the general opinion is on this question. It is a very interesting one and should be given some thought by every member of the craft.

Every reader of THE SANITARY ENGINEER should realize that we and they are making history. We are building up a new country and should profit by the experiences we ourselves have had as well as by that

of others. We should not cling too strongly to the past and hold petty prejudices. Our opinions should be given according to our actual experience on this, any opinion even though it be wrong, if frank and based upon personal experience is valuable. So that we hope to procure still more replies than we have so far had, though quite a number have sent in splendid ones.

We might state that these articles will be illustrated and should prove of great value on moulding the minds of those that have not had long experience, and in that way our whole country will benefit not only now, but in the future as well.

CANADA

FIFTY years ago the work of the Fathers of Confederation was but a document. To-day it is a great nation. The thing of paper has become the Dominion of Canada, a State which has good reason to boast but no need to boast. Canada's fame is sufficiently sounded by her neighbors. Those who behold her to-day pronounce the work of her founders to be very good. The constitution they made for her has lost nothing of the cohesive force their creative hands put into it. After fifty years of the stress and strain of the growing body politic to which it was fitted, it is as strong and as strengthening as ever. No other fifty years could have tested it in a more searching way, for in the last half century there have been many world events of the first order and there has scarcely been a halt in the swift advance of science. The great idea of the Fathers of Confederation not only satisfied the conditions for which they had immediately to provide, but it has proved adequate for all development, howsoever little some of them could have been foreseen fifty years ago. Canada is to-day a well-knit Confederation. What it has become in the last fifty years will not seem large when it is looked back upon by the Canadians of fifty years in the future. The vast region over which the Dominion extends is one of the richest on the face of the earth. It will attract people and capital from less favored or more crowded lands. But its wonderful natural resources, its material progress, and its great economic promise are far less precious than the spirit shown by its young manhood on the battlefields of Europe. Many a Canadian who was but a child on the first Dominon Day is now mourning a gallant son who died fighting for the land of his birth, the land whose progress he would have forwarded and in whose blessings he would have shared had life been spared to him. The men we call the makers of Canada were great ones, but how shall we render due homage to the preservers and defenders of Canada? May Canada always prove worthy of such sons!—*Mail and Empire.*

FIFTY YEARS OF PROGRESS

THE next issue of THE SANITARY ENGINEER will be one of the most interesting numbers ever published. It will contain a number of articles that will show what progress has taken place in Canada since Confederation in the sanitary and heating trade. Articles that will recall to many of our readers the practices carried out fifty years ago and why; the number of articles made in Canada in the old days and at present; boilers and radiators of the early days and now, with a few prophecies as to what is likely to take place within the next few years unless our craft take full advantage of present opportunities.

No doubt many of the things we have neglected have given rise to improvements that never would have been thought out had it not been for our own shortsightedness. Many of our sins of omission have resulted in a newer order of things. Our neglectful way of conducting business has given more impetus to the completing of systems. So that in spite of all our bemoaning about things left undone, there is always a silver lining behind a dark cloud, though we do not feel that it is right to keep on creating dark clouds in order to see the silver linings. We should rather strive to become of greater service to the other fellow, and in that way better serve ourselves. The day of greed is fast dying, and in years to come we shall be able to look back and recall some of the things done and recorded in THE SANITARY ENGINEER, July 15, issue of 1917. We shall be able to prove just how far we have carried out our dreams practical or impractical.

An Important Meeting to be Held in Montreal

One of the most important meetings in the history of the Sanitary Engineering trade is to be held in Montreal on Saturday, August 4th, in the Drummond Building. The Executive of the Canadian Society of Domestic, Sanitary and Heating Engineers will meet then in their headquarters at ten a.m. for discussion of matters intimately affecting the welfare of the trade, and important resolutions will be submitted for discussion and passed. A very large attendance of members of the Association is hoped for both from East and West, the Montreal members assuring visitors of a most interesting time, and business briskly transacted so that members attending from a distance will be able to catch their trains home if need be on Saturday evening. In case they desire to remain over for the week-end, a good time is promised them by the Montreal fraternity. Not only executive members, but all members are welcomed to this meeting, the subject matter of which is of very great importance to the trade throughout all the Dominion. Incidentally the meeting furnishes an opportunity for all members to re-affirm their appreciation of the Society's functions and the work being done, by turning in their per capita taxes, the humble, necessary dollar being useful in keeping the Society strong and active as an organization of Sanitary Engineers alert to the best interests of their calling in Canada.

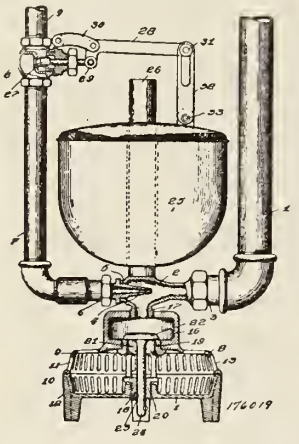
New Canadian Patents

No. 176,019.

The Penberthy Injector Company, Ltd., Windsor, Ontario, Canada, assignee of Leonard A. Pursell, Detroit, Michigan, U.S.A., 27th March, 1917; 6 years. Filed 31st January, 1916. Receipt No. 260,718.

Claim.—1. In a device of the class described, an ejector, a connection therefrom to service, a valve in said connection located materially above the ejector, an exhaust pipe connected to the ejector and into which the latter discharges, a float mounted above the ejector, an exhaust pipe connected to the ejector and into which the latter discharges, a float mounted above the ejector and connections from the float to the valve adapted to open the latter before the water reaches the level thereof.

2. In a device of the class described, an ejector, a connection therefrom to service, a valve in said connection located materially above the ejector, an exhaust pipe connected to the ejector and into which the latter discharges, a substantially vertical guide extending above the ejector, a float mounted to slide on said guide, and connections from the float to



176,019. Cellar Drainer.

the valve adapted to open the latter before the water reaches the level thereof.

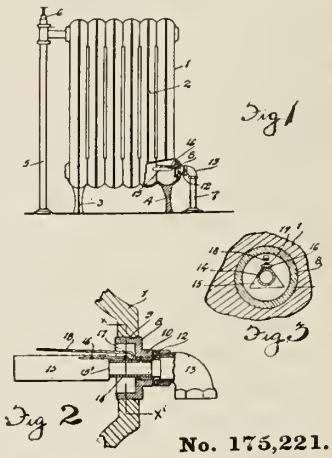
3. In a device of the class described, an ejector, a pipe connecting the nozzle thereof to a service pipe, a valve therein located materially above the level of the ejector, an exhaust pipe connected to the ejector and into which the latter discharges, a section connection, a chamber and valve therein, a float arranged above the ejector and connections from the float to the valve whereby the latter is actuated before the water reaches the level thereof .

4. In a device of the class described, an ejector, a pipe for connecting the same to service, a valve located in said pipe materially above the ejector, a guide mounted on said ejector and terminating below the level of said valve, a connection from said float for operating the valve before the level of the water reaches the latter, and an exhaust pipe into which the ejector discharges.

No. 175,221.

James William Ramez, Portage la Prairie, Manitoba, Canada, 20th February, 1917; 6 years. Filed 9th September, 1916. Receipt No. 269,626.

Claim.—1. The combination with a steam radiator and the drain pipe thereof of a steam trap comprising an outlet



No. 175,221.

Steam Trap for Radiators.

pipe entering the radiator and communicating with the drain pipe, and a float valve normally seated on the inner end of the outlet pipe.

2. The combination with a steam radiator and the drain pipe thereof of a steam trap comprising an outlet pipe entering the radiator and communicating with the drain pipe, and a pivoted float valve normally seated on the inner end of the outlet pipe.

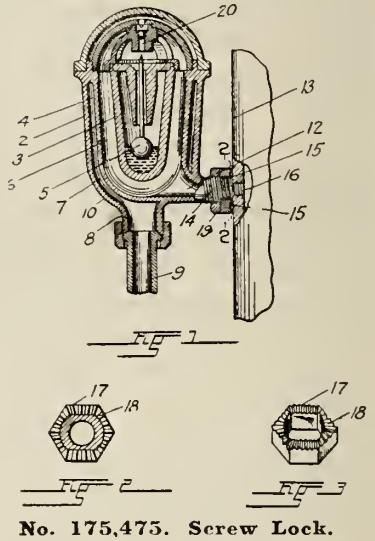
3. The combination with a steam radiator and the drain pipe thereof of a steam trap comprising an outlet pipe entering the radiator and communicating with the drain pipe, and a float valve pivotally attached to the outlet pipe and normally seated on the inner end of the outlet pipe.

4. The combination with a steam radiator and the drain pipe thereof of a steam trap comprising an outlet pipe entering the radiator and communicating with the drain pipe, a float valve pivotally attached to the outlet pipe and normally seated on the inner end thereof, and a stop bar limiting the swing of the valve in the unseated position thereof.

5. The combination with a steam radiator and the drain pipe thereof of a steam trap comprising an outlet pipe entering the radiator and communicating with the drain pipe, and an elongated normally horizontally extending float valve pivotally secured to the outlet pipe and having one end normally seating on the inner end of the outlet pipe.

6. The combination with a steam radiator and the drain pipe thereof of a steam trap comprising an outlet pipe entering the radiator and communicating with the drain pipe, an elongated normally horizontally extending float valve pivotally attached to the outlet pipe and having an end thereof normally seated on the inner end of the outlet pipe, and a stop bar extending from the outlet pipe and limiting the unseated position of the valve.

7. The combination with a steam radiator and a drain pipe of a steam trap comprising a screw plug screw-threaded into the radiator and detachably connected with the drain pipe, an outlet pipe secured to the plug opening to the radiator and communicating with the drain pipe, a normally horizontally disposed elongated float valve within the radiator and pivotally attached to the outlet pipe and having an end thereof normally seated on the inner end of the outlet pipe, and a stop bar extending from the outlet pipe and engageable with the valve to limit the unseated position thereof.



No. 175,475. Screw Lock.

No. 175,475.

James McKinon Chambers, Twin Falls, Idaho, U.S.A., 6th March, 1917; 6 years. Filed 21st January, 1916. Receipt No. 260,196.

Claims.—I. An air valve having a threaded nipple for its connection with a radiator, and a device co-operative with said nipple for locking said valve in a determinate position on a radiator to which it is applied.

2. An air valve having a threaded neck for its connection with a radiator, a nut on said neck, and means adapted to be operated by rotation of said nut for locking the valve in a determinate posi-

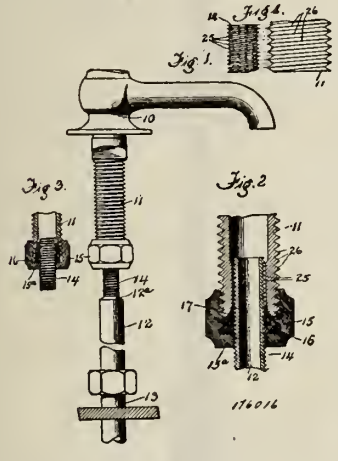
tion on a radiator to which it is applied.

3. An air valve having a threaded neck for its connection with a radiator, a nut on said neck, and a washer non-rotatably mounted on said neck to be driven by said nut toward a radiator to which the valve is applied, and having in its face opposite to that engaged by the nut serrations for entering the metal of which the radiator is composed.

4. An air valve having a threaded neck, a threaded nipple at the end thereof, a washer non-rotatably and slidably mounted on said neck and having oppositely, a plain face and a serrated face, and a nut on said neck engaging said plain face of the washer.

5. An air valve having a threaded neck provided with a flat face, a threaded nipple at the end of said neck, a washer non-rotatably mounted on said neck and slidably fitted on the faced portion of the same, and having oppositely, a plain face and a serrated face, and a nut on said neck, engaging the plain face of the washer.

6. A locking device comprising in combination with an object having an exterior thread and a flat face, a washer non-rotatably mounted on said neck and fitted on the faced portion of the same and having oppositely a plain face and a serrated face, and a nut co-operating with said thread, in engagement with the plain face of the washer.



176,016. Pipe Connection.

No. 176,016.

The H. Mueller Manufacturing Company, assignee of Ora B. Blair, both of Decatur, Illinois, U.S.A., 27th March, 1917; 6 years. Filed 12th December, 1916. Receipt No. 273,104.

Claim.—1. A coupling comprising an exterior threaded shank having a flaring inner wall at its end, a supply pipe formed of thin annealed metal provided with a reduced portion having external threads and slidably engaging in the end of the shank, the threads of said reduced portion being a multiple of the threads of the shank, a coupling member having its ends of different diameters and being internally threaded to engage over the shank and the supply pipe respectively, and a packing disposed in the coupling member about the supply pipe, said coupling member being adapted for longitudinal adjustment over reduced position of supply pipe, said coupling member further being adapted to be turned up on the end of the shank whereby the packing is compressed against the flaring wall of the shank and into the threads of said reduced portion, the coupling member moving uniformly over the shank and the supply pipe.

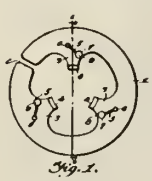
2. In an adjustable pipe coupling, the combination with an exteriorly threaded pipe, of a second pipe adapted to telescope in said first-named pipe and having exterior threads thereon of like pitch but in multiple of the threads on said first-named pipe, and a coupling member having complementary threads to engage the threads on both of said pipes so as to be movable thereon to secure a tight joint without affecting the adjusted telescopic relation of said pipes.

3. In an adjustable supply pipe coupling, the combination of an exteriorly threaded shank, of a supply pipe formed of thin metal adapted to telescope in said shank and having threads thereon of like pitch but in multiple of the threads on said shank, a coupling nut having complementary threads to engage the threads on both of said pipes so as to be movable thereon to secure a tight joint without affecting the adjusted telescopic relation of said pipes, and a packing adapted to be compressed between the end of said shank and said nut about said threaded supply pipe.

No. 175,827.

William R. Rioux, Montreal, Quebec, Canada, 20th March, 1917; 6 years. Filed 7th December, 1916. Receipt No. 272,867.

Claim.—1. A die of the character described comprising a body portion, a plurality of screw chasers formed integral therewith, the home portion of said chasers having diagonally extending slots formed therein, and means adapted to be inserted within said slots for moving





175,827.

Screw Cutting Die.

said chasers to different angles substantially as and for the purpose specified.

2. In a die of the character described comprising a ring, a plurality of inwardly projecting screw chasers formed integral therewith, the base portions of such screw chasers each having a diagonally extending slot therein and having one end terminating at one side of said screw chasers, and tapered plugs adapted to be inserted within said slots, for the purpose specified.

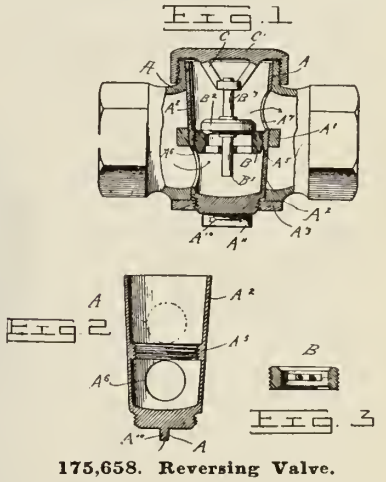
3. In a die of the character described comprising a split ring, a plurality of chasers formed integral therewith, each of said chasers comprising a web portion each of said web portions having a diagonally extending slot formed therein and extending transversely throughout each web portion, and a tapered pin adapted to be inserted within each of said slots adjacent the open ends thereof, substantially as and for the purpose specified.

4. In a die of the character described comprising a split ring, a plurality of radially extending screw chasers formed integral therewith, each of said screw chasers comprising a web portion having screw-cutting edges formed at and extending transversely across the outer ends thereof, said web portions each having a diagonally extending slot formed therein and extending transversely throughout each web portion, the inner end of each of said slot terminating in an enlarged aperture, the opposite ends of said slots each having an enlarged transversely extending aperture communicating therewith, and a tapered pin adapted to be inserted within each of said enlarged apertures substantially as and for the purpose specified.

No. 175,658.

Arthur L. Kirby, Unionville, Missouri, U.S.A., 13th March, 1917; 6 years. Filed 11th January, 1917. Receipt No. 274,217.

Claim.—A reversible check valve comprising a casing provided with a central



175,658. Reversing Valve.

bearing which is apertured, a tapering sleeve seated in said casing, closed at one end and circumferentially threaded, its other end open, the inner wall of the sleeve being threaded and provided with diagonally disposed openings positioned above and below the threading, a valve seat engaging the threaded portion on the inner surface of the sleeve, a flanged cap fitted over said casing and having inclined spider arms extending into the open end of the sleeve and terminating in an apertured bearing, a valve having stems projecting from the opposite face thereof and one having a bearing in said collar and the other in a central aperture in the valve seat.

Installation of Pneumatic Water Systems

Many Readers Are Being Confronted With Problems Relating to the Proper Installation of Pneumatic Water Systems.

By "Troubles Man."

THIS was a case where a similar type of pump as shown in Fig. 1 had been installed, and after the pump had been set in operation it appeared to work well for about 2 minutes, it then lost its prime, ceased to deliver water and simply pumped air until the leathers of the pump were worn out.

Several men were called in, the plumber installed the job in a very creditable manner and as far as could be seen the job was O.K.

Here are the particulars:—

The whole pneumatic system was installed in the basement, was electrically driven. The well was bored and had a 4¼ inch iron casing, situated about 50 feet from the pump, the well was 30 feet deep and the foot valve and strainer was within 2 feet from the bottom. Making a lift of 28 feet or thereabout.

The depth of water in the 4¼ inch pipe from the bottom of the foot valve to top of water when the pump was started was 4 feet and this water became exhausted in about 2 minutes, so that with the water at the highest point this pump lifted water 24 feet.

The owner refused to pay for the plumbing installation in full until the job was put right.

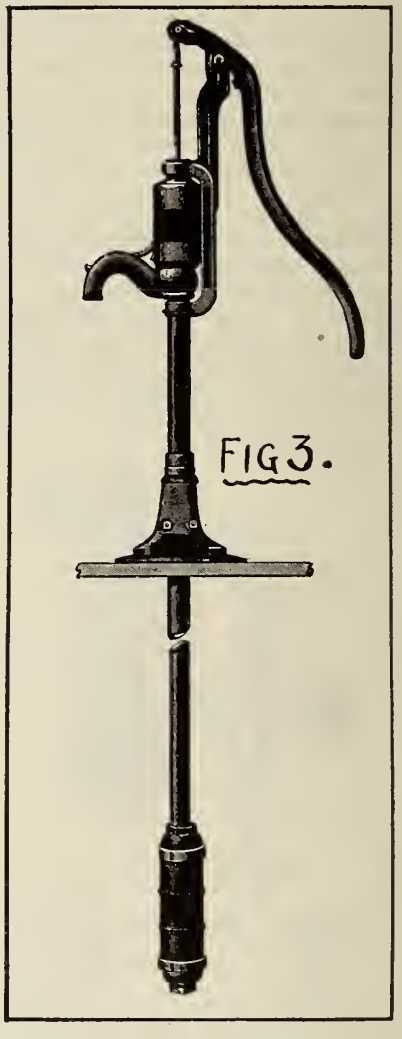
In the first place the system had been specified by an architect who thought he knew what was required. The well had been in use for several years, with a type of pump such as is shown in Fig. 3 and no trouble had been experienced, and therefore the owner as well as the architect were both satisfied that the well was O.K. At this point the writer was called in to locate the trouble, and the first thing done was to lift the suction pipe up out of the well, measure the depth of water, which resulted in finding as stated that there was about 3¾ gallons standing in the well. The suction pipe was replaced, the pump started. It just pumped water about 2 minutes and then stopped, the writer pulled over the switch and waited about 10 minutes, turned on the switch started the pump and it picked up, delivered water again for about 2 minutes and this went on for an hour, that is, every two minutes followed by a ten minutes wait, the pump would deliver water.

PROBLEM NO. 4

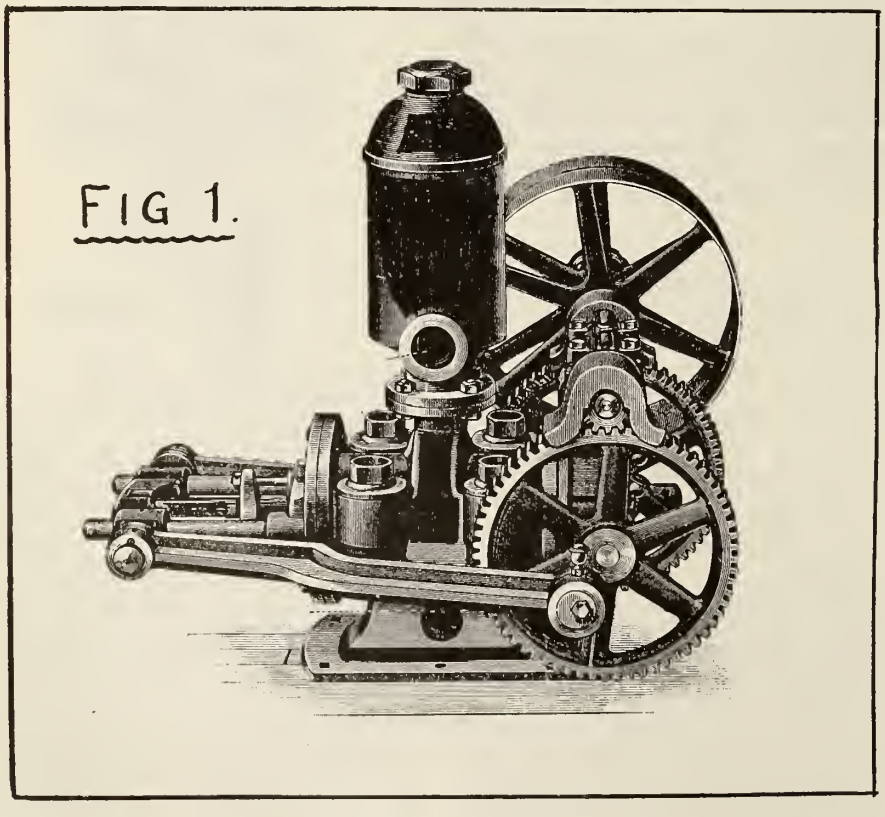
An electrically driven pump was installed in a basement near to the pneumatic tank.

Pump would deliver water for about two minutes, then water would cease to come. Pump lost its priming so the sanitary engineer said.

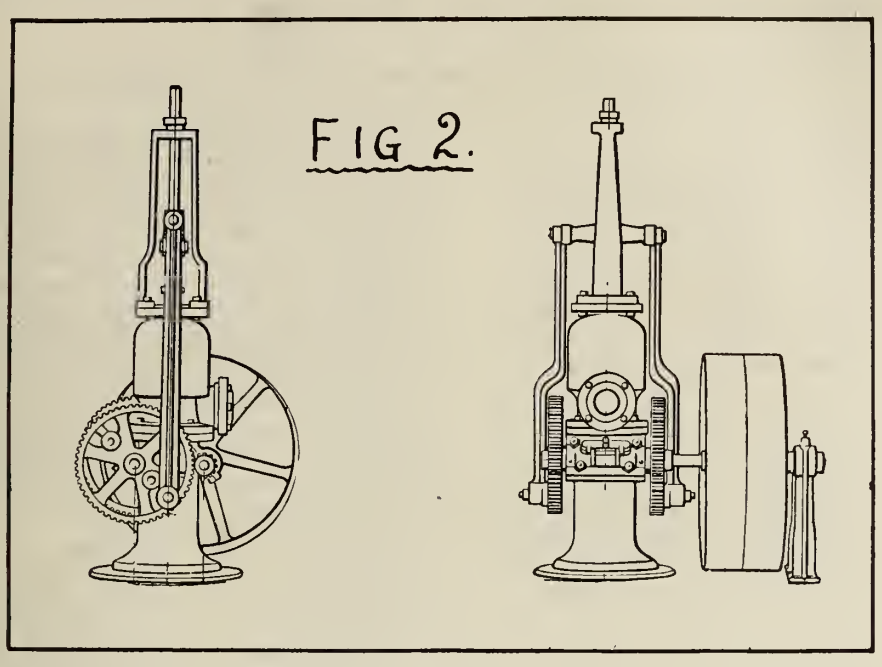
Now what was the trouble? What was proved, first that the pump was doing what it was not intended to do, viz.: drawing water from 24 to 28 feet, this could not be kept up for many months, it was certainly exacting a very high degree of efficiency from such a type of pump. Second that the water was being pumped out of the well at a faster rate per minute than the well was capable of furnishing, and still the owner and architect could not see that the well was at fault.



The writer tried all ways to convince these persons of the trouble but all to no avail, until the pipe to the pneumatic tank was disconnected, a length of hose attached thereto and the water pumped back into the well, and the results were that the pump worked for the



best part of a day pumping water. To further prove that the water was not flowing into the well as fast as the pump took it out, the hose was taken out of the well and the water allowed to flow on top of the ground, at once the pump ceased to deliver water after two minutes pumping.



Now, what does this problem show us? First that before a pneumatic system is decided upon, there must be a sufficient quantity of water to be obtained; second, that the proper type of pump is chosen to suit conditions. To have been sure, the type shown in Fig. 2 would have answered better, providing of course there had been lots of water, simply because the cylinder on the suction line would be submerged, or nearly so, into the water. When the owner and architect took the stand that there had been no trouble on account of water shortage before, they did not realize that a hand pump would not be expected to deliver water as fast as a power driven one, and further than that, a person would likely only draw about a pail or two of water at one operation and not likely again for several hours, so that the well would have the chance to refill, whereas in the case of the power system then installed the pump was capable and would require about 300 gallons at one pumping before sufficient water would be drawn to operate the electric switch.

However the well was dug and lined, making it larger and thus furnishing a large supply of water to draw from and to this day there has been little or no trouble. This case happened several years ago.

LETTERS TO THE EDITOR

Kingston, June 23, 1917.

Editor The Sanitary Engineer.

The very interesting and simple article by Wm. H. Rose in the June 15th number has been noted. I believe that a great percentage of stationary engineers understand (and apply their knowledge in practice where possible) the main points discussed by Mr. Rose as to heating engineers or men in charge of steam heating plants only. I cannot say whether they are up in this class of information or not. The article is written in such a fresh, chatty way that many men will read and learn. However, Mr. Rose will find difficulty at the present day in finding many duplex or other steam pumps costing the amount he figures. Many years ago it was the usual thing. At the present date the greater percentage of return and feed pumps are operated in such a manner that all the exhaust steam from them is used to heat water or some other useful purpose. When live steam is used for clean work, such as heating buildings, in double steam kettles, etc., it is all right to use return traps to bring the condensation back direct to the boilers, but where exhaust steam is used from steam engines, steam pumps, etc., where cylinder oil may be, not only should the exhaust steam pass through a good oil separator, but it is the best kind of policy to have the condensation pass through a filter or purifier before the condensation is returned to the boilers. In large closed heaters for water the condensation leaving the heater is often so low in temperature that it is good practice to pass the condensation through a heater before it is returned to the boilers. Mr. Rose is not in favor of the heater, but there are always exceptions to every rule.

In one installation I know of practically all the heat in the engine exhaust, or the live steam when the engine is not in operation, is extracted in heating water, and as the raw water is pumped from the lake at a very low cost, the conclusion arrived at was that nothing would be saved in heat units by returning the cold condensation to the boilers.

In the plant where I am employed we use two makes of return traps on the same principle as that shown by Mr. Rose, but there is as much difference in the ultimate results as there is between day and night. We also use two high pressure steam traps, which, I believe, is an excellent investment.

Mr. Rose is hot on having condensation returned to the boilers at a high temperature, but as he states in one part of his article, it is desirable to extract the heat as rapidly as possible doing useful work. When this is so, and many hundreds of jobs are so operated that the condensation is always at a fairly low temperature, then it is the best kind of practice to pass the condensation through a heater using either live steam or exhaust.

I await with interest further instalments of Mr. Rose's article.

JAMES E. NOBLE.

Rockwood Hospital, Kingston, Ont.

PASSING PROSPERITY AROUND

The expression above used is of American origin, and its practice is Nebraskan. In that State a small town in the centre of an agricultural district nearly "went broke" because the farmers kept their dollars instead of using them to pay their bills. A bright retailer in the town suggested to some other townsmen that they should try to run a Pay-Up Week, and the notion caught on, for the term had a humorous sound and furnished some good copy for the newspaper. Merchants advertised, "For the love of Mike pay the other man so he can pay us." The Chamber of Commerce boosted the idea, and even the banks took a hand in the bluff. Shopkeepers sent out their statements stamped at the bottom "This is Pay-Up Week—let's pass prosperity around," and displayed the slogan in their windows and on badges distributed among the school children. It is good to be able to record that people did pay up, and the story goes that one dollar bill was used twenty-seven times in discharging obligations. A slip attached to it requested that each person who used it as payment that week should sign his or her name in order that the story of its travels might be related. At the end of the week it found its way back to the first signatory in his pay envelope.

Sudbury, Ont.—The Town Council have awarded a contract for a steel standpipe to the Chicago Bridge & Iron Works, Bridgeburg, Ont., for $31,000.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Changes in the upward direction in plumbing lines have again been quite numerous and affect important commodities in the trade. Perhaps chief among the advances has been that in enamelware where a 15 per cent. increase has been made effective. Patent quick opening valves have been advanced in certain quarters and the market for all valves is reported to be in very firm position. Conductor pipe and conductor pipe elbows have advanced approximately 20 per cent. Black sheets have been in a steadily advancing market. A readjustment has been made in the price of boiler tubes wherein higher prices are made effective on some sizes and slightly lower on other sizes. Prices on cast iron fittings and malleable fittings are firm, higher prices being very probable in these lines. Business in the manufacture of valves is reported exceptionally good. In fact business with plumbing supply houses has been generally quite satisfactory. High prices now prevailing on some lines is expected to cause a falling demand.

TORONTO, June 29.—Higher prices have been made effective in a number of lines and with the firmness in the market for all raw materials other commodities connected with the plumbing trade bid fair to register still higher prices. There is quite a little building of dwellings at present, but operations for most part are confined to those actually required. In other words there is no speculative element in building at present. This activity is reported both in cities and smaller towns. Demand for steam valves still keeps remarkably good, being greater than the output of some factories. Higher prices on enamelware are expected to have a retarding effect on trade. Increasing cost of raw materials, coal and coke and shortage of labor are causing an acute condition in the market for some lines.

Bathtubs And Sinks Advance 15 Per Cent.

ENAMELWARE.—An advance of approximately 15 per cent. has been made in cast iron enamelware which makes new high record prices now effective. Prices on 4, 4½ and 5-foot baths are now $32.10 each and 5½-foot bathtub $35.70. All sinks and other enamelware has advanced approximately 15 per cent., which makes the price for the 18x30 in. Roll Rim $16.80. Closets remain unchanged at the advances recorded in last issue. The reason for the higher price is attributed to the cost of raw material, higher labor cost and high price necessary to be paid for both coal and coke. Demand for enamelware is reported fairly good but higher prices now effective are expected to curtail consumption to a considerable extent.

Bath-tubs, Roll Rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bathtubs, 5½ ft.	35 70
Sinks, Roll Rim, 18 x 30 in., staple	16 80
Closets, oak tank and seat	22.00
Do., enamel iron or white vitro tank	23.75

Conductor Pipe And Eavetrough Advance

CONDUCTOR PIPE, EAVETROUGH.—As intimated in these columns for some weeks past an advance has been recorded in the price of conductor pipe, eavetrough, conductor pipe elbows, bridge rolls and other similar lines. The increase amounts to approximately 20 per cent. The discount of these various lines is now 10 per cent. as compared with 25 per cent. off list as formerly. The situation has been caused through the advancing market in galvanized sheets, which are now quite generally quoted at $11 for 10¾ ounce and in some instances at $12. Demand for conductor pipe and eavetrough has been fairly good for this season of the year.

Stillson Wrenches Go Up 5 Per Cent.

WRENCHES.—By the change in discount on Stillson wrenches an increase of 5 per cent. in price has been made effective. The new discount is now 47¼ per cent. off list as compared with 50 per cent. formerly. Higher prices have been occasioned by the high prices in the steel market. Other makes of wrenches such as Coes and Trimo have made similar advances. A fairly good sale for wrenches is reported at the present time.

Cast Iron Fittings and Unions Very Firm

SOIL PIPE, AND FITTINGS.—There is a very firm situation in cast iron fittings and malleable fittings which points to an increase in price. Manufacturers have withdrawn recent quotations and new and higher prices are anticipated. Wholesale houses are still selling at the same prices but as soon as announcement by the manufacturers is made, a change can be expected. There is also a firm position in unions of various kinds which in the opinion of some closely connected with the trade points to higher prices. Soil pipe is in steady market with the demand fair. Prices remained unchanged during the time since last issue.

Medium and extra heavy soil pipe, 6-inch and under	40%	45%
8-inch soil pipe	....	35%
Medium and extra heavy fittings, and under	....	50%
Cast iron fittings	30%	32½%
Malleable fittings, Class A	20%	on list
Do., Class B and C	Net	list
Cast elbows, tees, etc.	30%	32½%
Unions up to 3-inch	....	45%
Plugs	40%	42½%
Bushings	40%	42½%
Flange unions, standard	30, 5%	40%
Nipples, up to 4-inch	....	50%
Do., 4½-inch and larger	....	45%
Do., running thread 4-in. and under	....	30%
Dart unions, ¼-inch to 2-inch	39%	39½%

Patent Quick Opening Valves Higher

VALVES.—Manufacturers of valves report the demand for steam valves continues exceptionally good. In this connection it is stated the demand is greater than the output of the manufacturing plants in some instances. There is a continuation of requirements for the shipbuilding industry which is reaching larger proportions as the development of this industry gets under way in Canada. Prices for all valves held in a firm position with an increase recorded in patent quick opening valves in certain quarters, the discount now being 45 per cent. where formerly it was 50 per cent.

	Discount off list
Ground work	35-53
Compression work, standard	55
High grade	48
Cushion work	49
Fuller work, standard	54
High grade	47
Basin cocks, No. 0 standard	53
High grade	49
Nos. 1 and 2	49-53
Bath cocks	55
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	45
Basin Cocks—	
No. 0 and 1, Fuller pattern	53

No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	40
Radiator valves, Jenkins disc	40
Radiator valves, quick opening	40

Oakum Prices Steady: Demand Fairly Good

OAKUM.—There has been a fairly good sale of oakum although the trade is not what might be termed brisk. The requirements of the trade are up to normal for this time of the year. Prices remain unchanged with no intimation of a change likely to take place in the near future. There have been considerable quantities absorbed by the shipbuilding industry of late and there are indications that still heavier demand will come from this quarter when the industry gets well under way in Canada.

	Per 100 lbs.
Best American	$21.00
U.S. Navy (American)	20.00
Plumbers' Spun	8.50 10.50

Galvanized Sheets For Range Boilers Scarce

RANGE BOILERS.—No improvement has been reported by manufacturers in the situation with respect to obtaining additional supplies of raw materials for the manufacture of range boilers. A situation which practically amounts to a famine exists on galvanized sheets of kind used in range boilers. Manufacturers are unable to promise delivery for several months to come and in the meantime stocks are about exhausted, some manufacturers stating they are now practically out of the market on account of their inability to get the raw materials. Prices remained unchanged during the time since last issue, a 10 per cent. advance having been recorded at that time. Wholesalers still have some supplies, however.

30-gallon range boilers, standard	$13.00
35-gallon standard	14 50
40-gallon standard	15.50
52-gallon standard	28.00
30-gallon extra heavy	17.00

Supplies of Wrought Pipe Not Up to Demand

WROUGHT PIPE.—Supplies of wrought pipe are not equal to the demand at the present time. This is partially accounted for by the fact that the consumption of pipe has been fairly good and partially from the fact that manufacturers are short on raw materials. Some sizes cannot be supplied at all. Prices in the local market are reasonable when compared with those existing in the United States. One dealer recently bought some supplies in that market but stated that he could not bring it in to sell at present quotations on the Canadian market. There is quite a bit of residential building going forward at present when taken throughout the country and this is causing a good demand. Prices remained unchanged since last issue at the following quotations:

Size	Black Per 100 feet	Galvanized Per 100 feet
Standard Buttweld		
⅛ in.	$ 4 50	$ 6 00
¼ in.	4 96	7 00
⅜ in.	4 96	7 00
½ in.	6 29	7 86
¾ in.	7 94	10 06
1 in.	11 73	14 88
1¼ in.	15 87	20 13
1½ in.	18 98	24 06
2 in.	25 53	32 38
2½ in.	40 95	51 77
3 in.	53 55	67 70
3½ in.	66 24	83 26
4 in.	78 48	98 65
Standard Lapweld		
2 in.	28 49	34 97
2½ in.	42 71	52 94
3 in.	55 85	69 23
3½ in.	68 08	86 02
4 in.	80 66	101 90
4½ in.	93 98	118 70
5 in.	109 50	138 40
6 in.	142 10	179 50
7 in.	185 60	232 05
8 L in.	195 00	243 75
8 in.	224 60	280 80
9 in.	269 10	336 38
10 L in.	249 60	312 00
10 in.	321 40	401 70

Prices—Ontario, Quebec and Maritime Provinces

Black Sheets Again 50c Hundred

SHEETS, PLATES. — Black sheets were again advanced 50c per hundred on certain of the heavier gauges. Boiler plates on ¼-inch thickness have been increased $1 per hundred to $11, while 3-16-inch has been advanced a similar amount to $11.10. There is an extra heavy demand for boiler plate at the present time due to the activity in the shipbuilding industry. This coupled with the scarcity of stocks and the inability of mills to fill new orders for some months to come has developed into a very strong situation. Galvanized sheets are also in a very strong position. Prices held steady at quotations of last week, the range being from $11 to $12 on the base size of 10¾-oz. One concern making the lower quotations on black sheets stated they were now out of stock and would not be in the market until stocks now on the way arrived.

	Per 100 lbs.	
BLACK SHEETS—		
10 gauge	$	$10 50
12 gauge	9 55	10 60
14 gauge	9 45	10 65
16 gauge	9 50	10 75
18-20 gauge	9 30	9 80
22-24 gauge	9 35	9 85
26 gauge	9 40	9 90
28 gauge	9 50	10 00
29 gauge	9 60	....
3-16 inch plate	....	11 10
¼-inch boiler plate	....	11 00
GALVANIZED SHEETS—	Per 100 lbs.	
10¾ oz.	$11 00	$12 00
U.S. 28	10 70	11 70
U.S. 26	10 40	11 40
22 and 24	10 25	11 25
18 and 20	10 10	11 10
16	9 95	10 95
14	9 85	10 85

F.o.b. Hamilton, Toronto.

Corrugated Sheets And Metal Siding Advance

CORRUGATED SHEETS.—A big advance was recorded in the price of corrugated sheets during the week, in one instance the price going from $7.25 to $8.75 per hundred square feet on galvanized and from $6 to $7.20 on painted corrugated, for No. 28 gauge. Dealers point to an unusual state in the market for this commodity in that they are selling for less than the plain galvanized sheets, as they naturally should be higher when it is considered that the corrugating is extra work put on the plain galvanized sheets. Standard galvanized shingles have also made an advance of $1.60 per square, now being quoted at $9.60, while the painted shingles advanced $1.25 and are now quoted at $7.50 per square. Siding metal has shared in the advance, standard galvanized being quoted at $8.40, an advance of $1.40 per square, while the painted is quoted at $6.60, an advance of $1.10 per square.

Concerns making the lower quotations on corrugated sheets as recorded in our last issue have increased their prices and the range now is generally quite higher. On No. 28 gauge the range is now from $8.70 to $9.20 per 100 square feet and on No. 26 gauge from $9.60 to $10.10. The majority of concerns are out of the market so far as stated quotations on the heavier gauges are concerned, but one concern still has some in stock which they are quoting at the following prices: No. 24, $14.40; No. 22, $17.40; No. 20, $20.40; No. 18, $26.40. Demand is not heavy on these latter gauges.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7 20
No. 26 gauge	9.60-10.00	....

Prices on gauge Nos. 24, 22, 20 and 18 given only when required by dealers.

Readjustment In Boiler Tube Prices

BOILER TUBES.—A readjustment of prices in boiler tubes was made during the week which provided for an increase in some instances and a lower price in other cases from these given last week. Mills are no longer quoting on this line of goods but stocks locally are fairly heavy and may meet the needs of the trade for some months to come providing an extra heavy demand does not develop. At the present time there is a fairly good demand. Following are the prices quoted on cold drawn and lapweld:

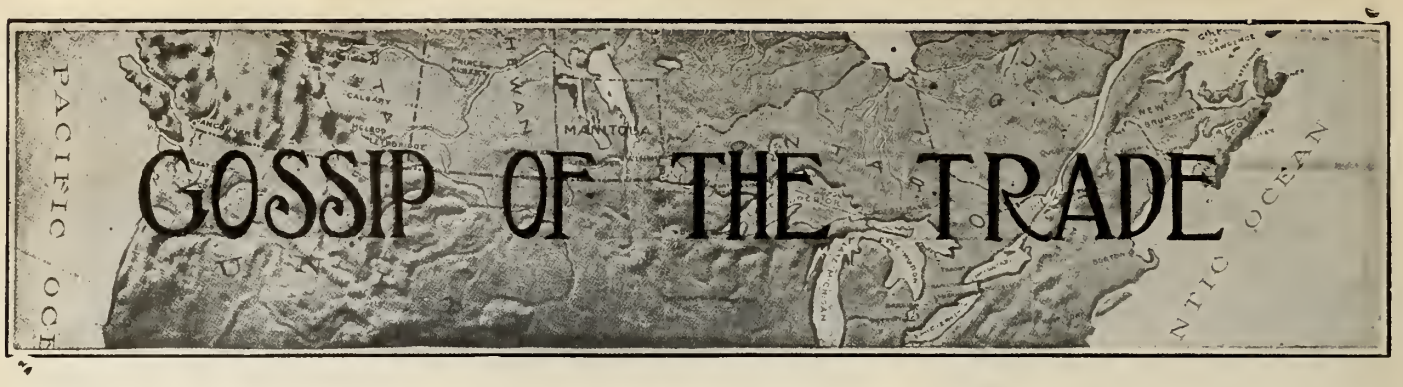
1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
3½-inch	70 00	55 00
4-inch	82 00	67 00

Lead And Zinc Products Very Firm

LEAD AND ZINC PRODUCTS.—Due to the situation in the pig lead and tin markets at primary points there is a firm position on lead and zinc products. Tin in the primary market at New York advanced 1½c per pound last week and lead is holding steady at high prices. Demand locally for lead sheets and solder has been fairly good. Prices remained unchanged during the week.

Lead pipe, lb.	$ 0 19	....
Lead waste pipe, lb.	0 20	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 17	....
Lead sheets, 3 lbs. sq. ft.	0 17¾	....
Lead sheets, 3½ lbs. sq. ft.	0 17¾	....

(Continued on page 30.)



GOSSIP OF THE TRADE

REGISTERED TRADE MARK

Robert J. Shannon, Toronto, Ont., Plumbing, Plumbers' Supplies, Heating Apparatus, and Steamfitters' Supplies. Representation of a length of pipe with a pendant sign tablet or frame suspended therefrom. No. 22431.

NEW CLOSET SEATS

The Goderich Organ Company, Goderich, Ontario, have taken out a copyright (Number 22406) to the name of "Never Split," being applicable to a line of w.c. seats manufactured by them. The word "Never Split" will be accompanied with the design of a tree stump with an axe in it.

WINNIPEG PLUMBING DEPT. REPORT FOR MAY

The following table shows what the staff of the Plumbing and Sewer Department in Winnipeg has accomplished during the month of May. By watching these reports one can easily see the importance of such work and the value of such a department to a community. In small towns we hear the councillors and citizens alike plead that "they could not afford" to hire a practical plumbing inspector.

In actual fact, these towns cannot afford to do without one. They are the losers in every way. Such towns are to-day suffering mostly from indebtedness as a result of the "cost of doing without" an inspector.

PLUMBING DIVISION	
Permits issued	109
INSPECTIONS	
Water tests	60
Smoke tests	135
Subsequent inspections	294
Miscellaneous inspections	29
Defects rectified	200
SEWER DIVISION	
Permits issued	31
Connections constructed	27
Inspections	98
SEWER FLUSHINGS	
Tank flushings, gallons	1,462,528
Hose flushings, gallons	793,750
Total gallons	2,256,278

If our students were to say when finding the need of a good text book, "I cannot afford it; I must get along without it," we know that their progress would be very limited. It is the same with the towns and villages that start out with no plumbing by-laws or practical plumbing inspector. Millions of dollars are being wasted to-day as a direct result of not investing in those things that are essential, because of the supposed expense.

A NEW BOOK ON FACTORY SANITATION

To put forth a number of convincing arguments in favor of factory sanitation should not be a very hard task and really never was, but, there are arguments, and arguments. "Cleanliness is next to Godliness," and always was. "Be thou clean" is a command we read in the Good Book, and a thousand and one reasons may be put forth in favor of sanitation in the factory. Then we have sanitary by-laws, Nature's laws, etc., all of which to some extent are being lived up to in a crude slip-shod manner.

DREAMING—WORKING.

It is not in the quiet and dreamy spots
That life develops the best;
But the snap and tang of the busy mart
Fills a red-blood man with zest.

The dreamer ends in the poorhouse,
The do-er has money to spend;
If you wait for success to hail you,
Your span of years may end.

If you pass your time in dreaming
Your task will remain undone;
The weakling lives in his memory,
The sluggard in what may come.

But wisdom hath one day only
In her calendar of life,
Not Past or Future, but Present,
To conquer self in the strife.

So chain your mind to business,
When dreaming obscures the view,
For only grit and elbow-grease
Can make your dreams come true.

—Eva E. Hamilton.

LUCK!

When a man wins without effort—it's luck.

When a man makes the effort—and fails—it's hard luck.

When a man laughs at hard luck—and keeps on plugging—it's a sign of good luck coming.

When a man works and wins—it's not luck—it's what he had coming.

Luck is fickle—work is sure.

Let us for a moment, however, forget our sentiment, and talk dollars and cents, and by so doing we will at once get the interested ear of the purely dollar and cent manufacturer. He it is who buys machinery so as to increase the output of his factory and at the same time cut down his bills for labor. Then use dollar and cent arguments in canvassing the manufacturer's business.

The new book referred to in the heading is published by the Standard Sanitary Mfg. Co., Pittsburgh and Toronto, and to give our readers an idea of its value we will quote a paragraph therefrom.

Economic Value of Factory Sanitation

"The necessity for modern sanitation in the factory does not rest entirely upon the value of sanitation for hygienic reasons, but is made imperative by the fact that money is saved, production cheapened, cost of maintenance lessened, better employees secured and their efficiency enhanced by the proper number and distribution of sanitary appliances.

"If, for instance, in a factory employing 500 men, each man loses three minutes a day walking an unnecessary distance to water closet or urinal, or waiting in line at the toilet conveniences for their turn, it would mean a loss each day of over three working days for one man. Allowing an average of $2 per day and 300 working days in the year, then the loss from this cause alone would be $1,800 annually, or an amount sufficient to pay interest at 5% on $36.000 for extra equipment. As a matter of fact, however, the extra equipment to give all the w.c., urinal and other sanitary fixtures necessary for a plant of that size, would cost but a fraction of that amount. Perhaps not as much as would be saved in one year by having them."

This book, which contains lots of practical illustrations too, may be procured free by writing to the publishers for same.

"STANDARD" WAR GARDENS

In line with President Wilson's proclamation asking the people to do their "bit" in the way of increasing the growth this year of farm and garden product the Standard Sanitary Manufacturing Company had its plant in Tiffin, Ohio, inaugurate a system of war gardens. In front of its plant, the company has a plot of eight acres which is being held for future developments, and it is in this

plot that the war gardens are now being made.

The plot consists of eight acres which has been ploughed and subdivided into one hundred and twenty-six garden plots, each measuring forty by sixty feet. The free use of this ground was offered to all of the employees in the plant, and as a result eighty-five have taken space and are now cultivating war gardens.

The above picture shows the plot of ground ploughed up and ready for its first cultivation, with the plant in the background. The eighty-five men who have undertaken to cultivate this plot are working most earnestly and enthusiastically, and for amateur farmers they promise a great output. The work is done early in the morning and in the evening, and every assistance is rendered by the company. Later in the season prompt reports on this particular plot of eight acres will be issued to show how much the "Standard" employees in Tiffin have contributed to the country's welfare.



The war gardens on the premises of the Standard Sanitary Co. Tiffin plant, Ohio.

TRADE GOSSIP

Waterloo, Ont.—V. Hohmeier, for years in the plumbing trade here is dead in Edmonton, Alta.

Beamsville, Ont.—Beamsville Plumbing & Tinsmithing Shop have moved to new quarters in the Amiss Block.

Winnipeg, Man.—International Supply Company, manufacturers of sanitary supplies, suffered recent fire loss.

Montreal, Que.—Imperial Plumbing & Electrical Co. has been dissolved. H. Weiss continuing under same style.

Toronto, Ont.—McGregor & McIntyre have been awarded the structural steel contract for the new boiler shop for the Polson Iron Works.

Hamilton, Ont.—The Provincial Government are building a power house at the Asylum here. Tenders are now being called for the reinforced concrete work.

Campbellford, Ont.—E. M. Proctor, B.A.Sc., representing James London and Hertzberg of Toronto is completing plans here for a sewer from the schools and the plumbing within the building.

Hamilton, Ont.—City Engineer E. R. Gray is preparing specifications for the additional steam and electrical equipment which will be installed at the pumping station. The cost is estimated at $127,000.

Oshawa, Ont.—The Town Council have given the first and second reading on a by-law to authorize an expenditure of $38,000 on a filtration plant. The John Ver Mehr Co., of Toronto, have already been awarded a provisional contract.

Regina, Sask.—Thos. Watson, Hon. secretary of Royal Sanitary Institute of Great Britain states that Miss E. B. Pithie of the bureau of public health, has passed examinations entitling her to the institute's certificate as a sanitary inspector.

St. John, N.B.—Capt. T. E. Ryder has and G. Clifford McAvity have formed a partnership to carry on a hardware sales agency and commission business under the name of the St. John Sales Company. Both are connected with T. McAvity & Sons, Ltd.

Sir Alexander R. Binnie, the well-known engineer, died at his home in Devonshire, England, in May. He carried out many important public works and was president of the Institute of Civil Engineers in 1905-6. Sir Alexander investigated the Ottawa water supply a few years ago and recommended a scheme which was afterwards abandoned on account of the heavy cost.

Toronto, Ont.—James R. Phillips, of the firm of J. G. Greey, mill machinery engineers, Toronto, died in the General Hospital recently as the result of burning injuries sustained at the works. The late Mr. Phillips was born in the Township of Vaughan 63 years ago. On coming to Toronto he joined the John Abell Co., and later became superintendent for the Pease Foundry Co., a position which he held for 24 years. Fifteen months ago he became associated with J. G. Greey Co.

St. John, N.B.—Capt. F. E. Ryder has just received promotion from the grade of Lieutenant. He has also been awarded the Military Cross, and on more than one occasion has been mentioned in despatches. Capt. Ryder is the manager of the St. John House of the Canadian Fairbanks-Morse Co., Limited, on leave of absence at the front. He was, previous to the war, an officer in the St. John Battery. When the war broke out, he immediately enlisted for active service, and was attached to the ammunition column, Heavy Battery.

EXPERTS' ADVICE ON PREVENTION OF THOSE MYSTERIOUS GASOLINE FIRES CAUSED BY FRICTIONAL ELECTRICITY

For some time past there have been reported a number of cases of fires originating during the handling of gasoline when there was apparently no means of starting a fire. No one near the gasoline smoking or carrying matches, no open lights of any kind in the vicinity, or any other apparent cause, is the usual description of the circumstances surrounding a fire in a gasoline tank, which to all appearances just simply happened.

On investigation of some of these individual cases, authorities state that the majority have been found to be due to the ignition of gasoline vapors by sparks of static electricity. When two non-conducting substances such as silk and glass, or flannel and hard rubber, are rubbed together, frictional electricity may be generated. Static electricity may also be generated by the friction between a non-conductor, such as gasoline, and a conductor, such as a metal pipe or can. Conditions favorable to the generation of frictional electricity often prevail in handling gasoline, especially when replenishing the supply in automobile tanks.

To Preserve Safety

In the interest of safety, as regards accidents from the electric ignition of gasoline, experts suggest that in drawing gasoline from a pump into a can, the metal of the can should always be in contact with the metal of the pump, so that any electricity that may be generated can pass off quickly through the pump to the ground. Wooden handles or other insulating substances on the bails of cans should be removed at once, so that when a can is hung up by the bail on the pump hook all parts of the can will be electricity contact with the pump.

In filling the tank of a motor vehicle with gasoline from a can through a metal funnel containing a chamois-skin strainer, care should be taken to have the metal of the funnel in electrical contact with the metal of the tank, and also to have the can from which the gasoline is poured kept in electrical contact with the metal of the tank or funnel.

Friction Causes Fire

In filling the tank of a motor vehicle with gasoline from a pump with a hose having a metal nozzle, fires have been known to occur from frictional electricity generated by the passage of the gasoline through the rubber hose and collecting in dangerous intensity in the metal nozzle, from which it is discharged by means of a spark when the nozzle is brought near to any metal substance. During the process of filling in this manner, the metal nozzle should be kept in electrical contact with the car tank, or a hose with a metal lining should be used.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

DIFFERENCE IN PUMPS

The next pump to describe under above heading is that of a common suction and force pump, often called a lift and force pump, for the reason that it simply lifts the water at one motion and forces it only at the next.

All single acting pumps are built upon the same principles as those already shown, though the designs may differ somewhat.

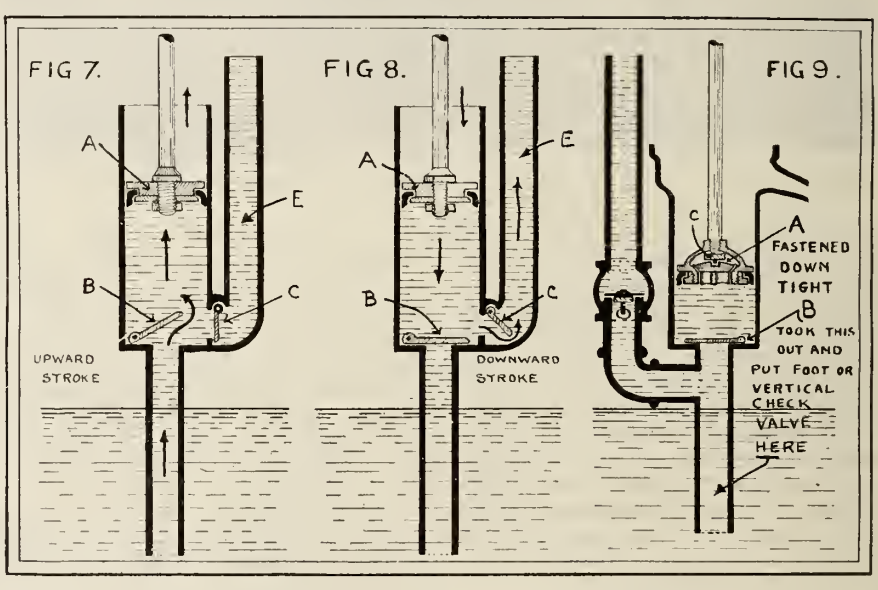
If our readers will note the type shown in the last issue, on page 32, they will see that Figs. 4, 5 and 6 are very similar to Figs. 7 and 8 shown below, and both deliver water in much the same way, except that in Figs. 4, 5 and 6 the water is *lifted* from the well, and *lifted* to a higher elevation with the upward stroke of the piston, and that the downward stroke is, as we stated, merely mechanical, necessary only to displace the water from below the valve A to above.

Now note the difference in Figs. 7 and 8. A is the piston. No valves are fitted in it, the pump cylinder has an open top, Clacks B and C serve very much the same purpose as in Figs. 4 and 5, but clack C is below the piston and dispenses with one valve. Each operation, or rather motion, counts for something. The upward stroke sucks or draws the water up into the cylinder (see Fig 7), while the downward stroke *lifts* or forces the water to a higher level (see Fig. 8). While there are no foot valves shown they are very necessary on all pumps, no matter what type they be, except such as are submerged in the water at all times, and then, of course, the pump is fitted with a valve to suit its own type.

Pitcher Pump Converted

It might not be out of place to give a little experience which the writer once had when on a job in an out of the way place. Water was required for a few weeks in an elevated tank, and the customer did not wish to buy a new force and lift pump. Moreover, it would have taken several days to get one to the job, and in many ways would have been a great inconvenience.

The writer located an old cistern, or pitcher pump, as shown in Fig. 9, and at once saw a way out of the trouble. Taking the suction pipe off the bottom and putting a check valve on, then a tee, nipple, elbow, nipple and another check valve as shown, next putting a piece of blotting paper between the seat and valve A, then inserting a wedge C, making the valve A tight and thus preventing the water from coming up to the pitcher spout.



It will be seen that Fig. 9 is very similar to Figs. 7 and 8.

Fig. 9 answered the purpose admirably for several weeks and was then converted back to its original form for use in the kitchen.

In our next issue we will describe what is known as a solid plunger pump with and without the air chamber.

Continued in next issue.

Catalogues and Booklets

AIR COMPRESSORS

The Canadian Ingersoll-Rand Co., Montreal, have issued a new bulletin describing their class FL-1 steam-driven, single stage, straight line, air compressors. The construction and principal features of this machine are described fully, accompanied by detail illustrations and general views.

"MOR-LITE" PLANT

Canadian Fairbanks Morse Co., Ltd., have issued an attractive booklet illustrating their Mor-Lite self-starting, self-stopping and self-running electric light generating plants for private use. Complete specifications of the plant are given, and its compactness combined with convenience for country homes are the chief features.

DIE AND HOLDER CATALOGUE

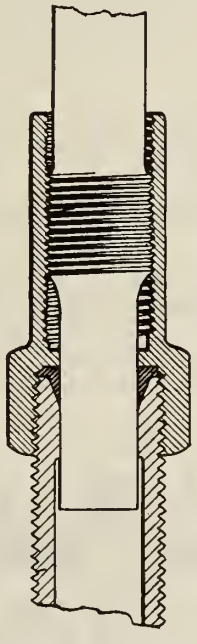
Greenfield Tap and Die Corporation, Greenfield, Mass., have issued a catalogue illustrating their G. T. D. Acorn dies and holders. A brief story of the origin and design of the Acorn Die prefaces a handsomely illustrated booklet of the various types of dies and die holders with complete specifications and prices.

ADJUSTABLE

Screw Joint Coupling

for Supply Pipes

(Letters Patent No. 162,577)



The illustration shows the principle of application. The threaded shoulder on supply pipe engages internal thread of Screw Joint Coupling, allowing a total adjustment of TWO INCHES.

In addition to the adjustable feature, PACKING RING effectively prevents the possibility of LEAKS.

The Adjustable Screw Joint Coupling represents a combination of Common-Sense and Experience. It has justified expectations that it would perform an ordinary service in an extraordinarily efficient manner.

Fitted on all Noblo Supplies.

Manufactured by

H. Mueller Manufacturing Co., Limited

SARNIA, ONTARIO

MARKET REPORTS

(Continued from page 25.)

Lead sheets, 4 to 6 lbs. sq. ft..	0 17½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 42	....
Solder, strictly, lb.	0 41½	....
Solder, commercial, lb.	0 40	....
Solder, wiping, lb.	0 40	....
Solder, wire, lb.	0 45	....
Zinc sheets, per lb.....	0 26	....

Old Lead Pipe And Brass Quotations Up

OLD MATERIALS.—Higher prices were being quoted by dealers in old materials on heavy lead pipe, red brass, light brass and heavy copper during the week. Lead pipe advanced ½c, red brass ½, light brass ½c, and heavy copper also ½c for better grades. Tea lead was quoted down ¼c, while old rubbers, boots and overshoes were also quoted down ½c. There is a good demand for old materials with the exception of old rubber goods. Following are the quotations:

Tea lead .....$	0.08¼	.....
Heavy lead pipe	0.11	.....
Yellow brass	0.15¼	0.15½
Red copper	0.22½	.....
Light brass	0.10	.....
Heavy zinc	0.08½	.....
Heavy copper	0.26	0.27½
Old cast iron, per ton	....	25.00
Stove plate, per ton	16.00	17.00
Old rubber, boots and shoes...	0.08½	.....
Overshoes, lumbermen's rubber boots	0.08½	.....
Auto tires	0.06½	.....
Bicycle tires	0.03½	.....

Pig Iron Continues To Go Upward Still

PIG IRON.—Prices locally are still withdrawn. Reports from the United States indicate that the average shipping price to-day is $20 per ton below the prevailing market. Not a little concern is becoming apparent in the United States over the iron and steel situation. Prices of raw materials are still rising. The proposals for Government control are still coming in for attentive consideration.

LEAD.—The Trust price in New York at time of writing still held at 11c, with outside interests quoting higher. The American Government has agreed to purchase 8,000 tons between now and Aug. 1 at 8c lb. Local prices range from 15c-15½c lb.

COPPER.—Contradictory reports are heard regarding the action of the U. S. Government in purchasing copper. One report is to the effect that the Government will pay 25c lb., but in other quarters this is not thought probable. There is no change in the general situation, and the market is in a waiting mood. Local prices remain at 37½c-38c lb.

SPELTER. — The U. S. Government has purchased over 23 million pounds of a high-grade spelter at 13½c lb. in car lots. Other grades are offered in New York at 9c-9½c lb. Locally the price remains at 11½c to 12½c lb.

TIN.—No change is noted locally in tin prices and quotations remain at 63c-65c lb.

ANTIMONY.—No change is noted locally, and price remains at 25c.

ALUMINUM.—The market is unchanged locally at 68c lb.

L'AIR LIQUIDE SOCIETY, OF MONTREAL, HAS COMPLETED ARRANGEMENTS TO ESTABLISH BRANCH

A branch factory is to be established at Halifax by the L'Air Liquide Society, the Canadian headquarters of which are at Montreal, where the company has a large factory. Negotiations for the purchase of a lot have been completed by Charles Royer, the general manager, who was in Halifax last week. The factory will be located in the vicinity of the Cotton Factory siding, and will be 100 x 50. The company will manufacture acetylene cutting and welding machinery.

Grimsby, Ont.—Metal Craft Company have commenced operations in the newly completed factory.

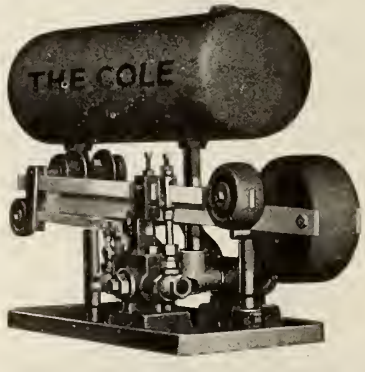
FOR SALE

PLUMBING AND HEATING BUSINESS FOR sale, in City of Kitchener; 12 years established and lots of work to do. Apply at Box 701, Sanitary Engineer.



CONDENSATION

Handled in the proper way is being done by steamfitters thruout the country. Are you one of them?



Information regarding the "Cole" Return Trap System, gladly furnished upon request to

GEO. W. COLE, Limited
838 Dundas St., TORONTO

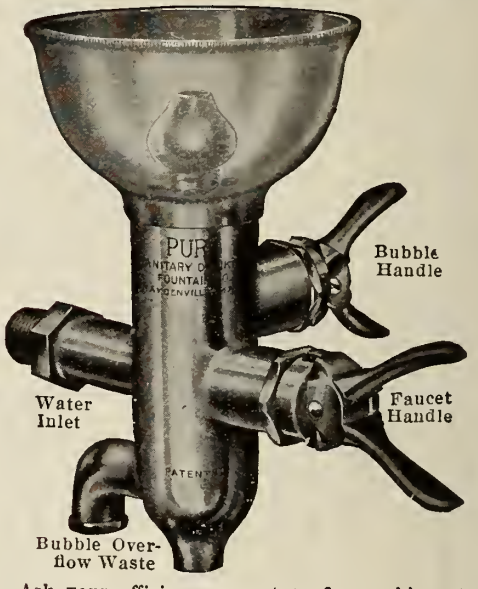
PURO

(MADE IN CANADA)

Every minute counts in getting maximum efficiency.

Our Puro Sanitary Drinking Fountains positively save 60% in drinking time, besides 35% of water ordinarily wasted. Can you afford to run your plant and lose and waste this money in old-fashioned drinking methods?

EFFICIENCY IS PATRIOTISM



Ask your efficiency expert to figure this out and you will find that:

500 men drink, say, twice a day. Under old conditions it takes between 3 and 5 minutes per man, twice a day. With PURO cutting the time in half, it would save from 1,500 to 2,500 minutes per day at an average wage of 20c per hour. The saving would be from $5.00 to $8.50 per day.

How long would it take to pay for installing our fountains?

NOW IS THE SEASON TO THINK OF YOUR WATER PROBLEMS.

ASK OUR EXPERT ADVICE.

Puro Sanitary Drinking Fountain Co.
147 University Ave., TORONTO, CAN.



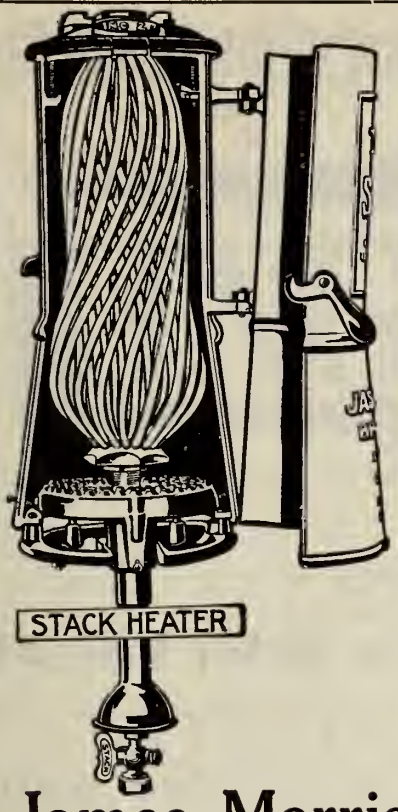
Vent Caps

Cleaning screws, and drain checks' prevent flooding. Machinists, Brass Finishers and Plumber Specialties.

MALCOLM and COMPANY
64 Lombard St., Toronto

FOR SALE

UNDERWOOD TYPEWRITERS.—Modern visible machines equipped with such improvements as back spacer, bi-chrome ribbon, tabulator and automatic ribbon reverse. Five year guarantee. Sold for cash or payments. Free trial. Send for proposition to-day and save more than half regular price. Address, Arthur O. Secord Co., Limited, Dept. 2, Brantford, Ontario.



STACK FACTS

From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

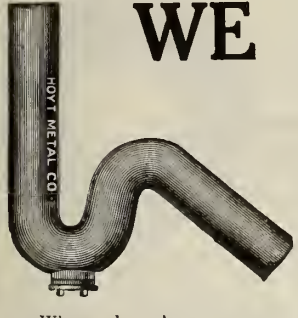
The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited

93-97 Adelaide Street West, TORONTO



WE ARE SPECIALISTS IN

OUR OWN LINE

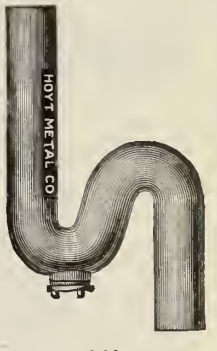
This is the day of the specialist. When you buy lead traps, lead waste pipe, lead bends, etc., you should see that quality is the outstanding feature. If you don't you are liable to pay in wages for lost time far more than the goods are worth. We make a special study of the lines we make.

Our Mixed Metal Sales Amount To Over $5,000,000 Annually.

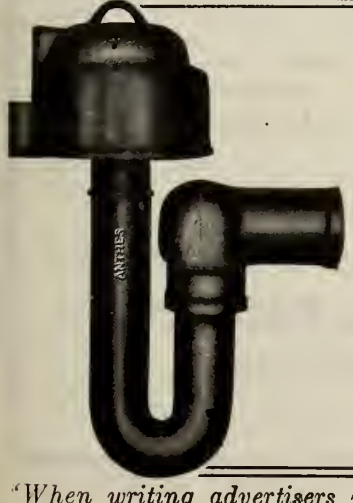
When buying wiping, bar, or wire solder, ask for HOYTS.

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y., London, Eng., St. Louis, Mo.



Your jobber can supply it; if not, write us.



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

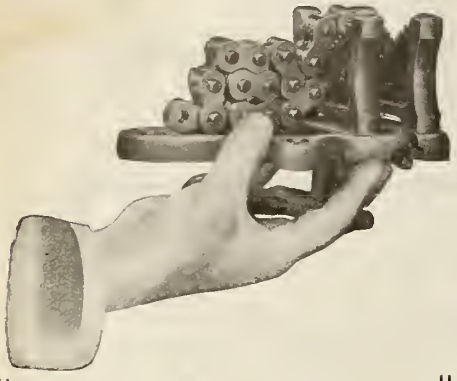
Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

SINCE IT'S ONLY A HANDFUL

WHY LEAVE IT BEHIND?
3 Sizes Capacities ⅛ to 8 inch pipe



WILLIAMS "VULCAN" CHAIN PIPE VISE

Before you return you may need to turn a thread, make a bend, cut off an end or perform any of the other ordinary operations for which a steamfitter is usually summoned.

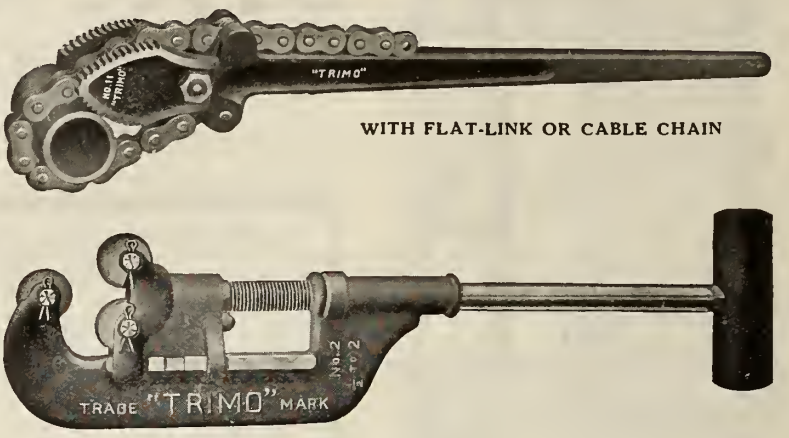
Better go prepared and clinch a life-long customer on your first visit.

They won the "Grand Prize" of the P.P.I.E.

J.H. WILLIAMS & CO.
77 Richards Street BROOKLYN, N.Y. CITY
The Wrench People

World-Famed Specimens of the Age of Steel

TRIMO TOOLS



WITH FLAT-LINK OR CABLE CHAIN

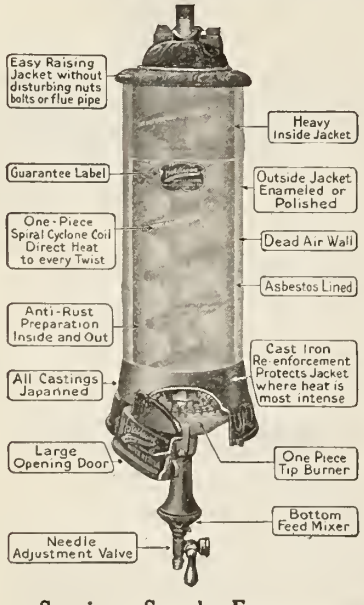
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MADE BY

TRIMONT MFG. CO., 55 Amory St., Roxbury, Mass., U.S.A.

Kindly mention this paper when writing Advertiser.

Quality Survives



Service—Speed—Economy

If your jobber can't supply you—write direct

THE HOTSTREAM HEATER CO.
CLEVLAND, OHIO

W. H. Cunningham, 98 Kingswood Rd., Toronto, Canadian Representative.

Isn't it a fact that YOU can buy "Water Heaters" at any old price? But did you ever stop to realize that your CUSTOMER buys the SERVICES of the heater—not the heater itself? Even if he THINKS he wants the cheapest heater made, he EXPECTS GOOD SERVICE, and if he doesn't get it he BLAMES YOU. He FORGETS his only saving is in first cost, yet DEMANDS that it meet with HIS idea of a Water Heater in SERVICE, SPEED and ECONOMY.

Hotstream Heaters are built to meet YOUR CUSTOMER'S VIEWPOINT—he is the man to be ultimately satisfied!

Remember—you can't buy Creamery Butter for the price of Oleo.

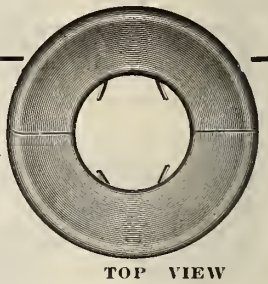
Yet the price of a Hotstream is small compared to what its EXCELLENT SERVICES justify.

You owe it your business to investigate and compare Hotsream Heaters with those you are using.



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

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THE BOILER TO SPECIFY

You take no chances when you specify

KING Hot Water Boilers and Radiators



because we guarantee every boiler to live up to the claims we make for them. We assist you to build up a lasting reputation that counts, when we supply you with our goods.

STEEL AND RADIATION, LIMITED

Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

HEAD OFFICE: Fraser Avenue, TORONTO

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WHY NOT SAVE MONEY?

We Manufacture Lead Wool and Lead Pipe



We Manufacture Sheet Lead and Wiping Solder

LEAD WOOL FIBRE

Let Us Tell You How You Can

No Gasolene Needed *No Troublesome Fire-Pot*
No Lost Time Waiting *No Melting*

AND NO LEAKS

Less weight of metal per joint required. Joints can be made in any awkward position, in damp places or under water.

Have You Seen Our Lead Roof Flashing?

CUT TO ANY SIZE AND NO WASTE

REMEMBER, "It's not the money you earn that counts, it's the money you save."

THE CANADA METAL CO., LIMITED

TORONTO, CANADA

WRITE FOR FULL PARTICULARS AND SAVE MONEY.

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Air Valves.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Asbestos Goods.
James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Joseph Breeden & Co., Ltd., Birmingham, England.
Canadian Brass Co., Ltd., Galt, Ont.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Limited, Galt.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Brass Pipe and Tube.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Dralners.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Closets.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., Ont.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.

Country Residence Equipments.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Damper Regulators.
W. E. Clark Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Ejectors, Steam.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

Ejectors for Sewage.
National Equipment Co., Ltd., Toronto.

Enamelware.
Amherst Foundry Co., Ltd., Amherst, N.S.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

Electric Pumping Machinery.
Canadian Machinery Co., Ltd., West Toronto.
Empire Mfg. Co., Ltd., London, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Flushometers.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

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Beaton & Corbin Mfg. Co., Southington, Conn.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatbam.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Gasoline Engines.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Gas Water Heaters.
Galt Brass Co., Ltd., Galt.
Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Rolf Heater Co., Columbus, Ohio.

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W. E. Clark & Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Heaters.
Lord & Burnham Co., Toronto.
Steel & Radiation, Ltd., Toronto.

Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Canada Metal Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
Speakman Supply & Pipe Co., Wilmington, Del.

Monkey Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Oil Burners
National Rotary Oil Burner Co., Boston, Mass.

Oil Storage Systems.
National Equipment Co., Ltd., Toronto.

Packing.
Canadian Wolverine Co., Ltd., Chatham.

Packless Radiator Valves.
W. E. Clark & Co., Toronto.
Kerr Engine Works, Walkerville.

Pipe and Radiator Hangers.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.

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Canadian Tube & Iron Co., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

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Trimont Mfg. Co., Roxbury, Mass.

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Canadian Wolverine Co., Ltd., Chatham.
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Anthes Foundry Co., Toronto and Winnipeg.
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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Pumps.
Canadian Machinery Co., Ltd., West Toronto.
C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Radiator Foot Rests.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,

Radiator Traps (Steam).
W. E. Clark & Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.

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Toronto Hardware Mfg. Co., Toronto.

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Canada Metal Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
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Rubber Goods
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Septic Tank Valves and Syphons.
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Dart Union Co., Ltd., Toronto.
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Vacuum Systems of Heating.
W. E. Clark & Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.

Water Supply Systems.
Canadian Machinery Co., Ltd., West Toronto.
Empire Mfg. Co., Ltd., London, Ont.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
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Beaver Die Stocks

Full Thread at One Cut

with the

"Beaverette"

A Compact and Complete Tool

NO CHANGING OF DIES—NO BACKING OFF—NO LOOSE BUSHINGS. These are some of the advantages of the "Beaverette" not found in any other tools. Cuts from ⅛ to 12 inches.

One man can cut a 12-in. thread easily with our tool.

Beaver Pipe Cutters



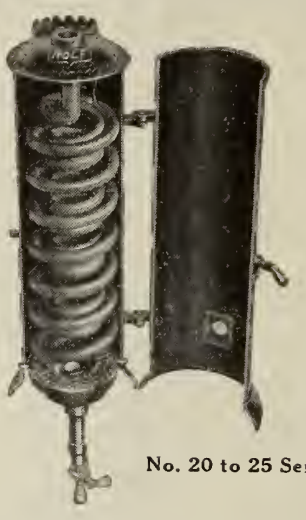
Make a square, clean cut, and leave no burrs. There's less friction on hot water jobs and less wet steam on steam jobs when the Beaver square-end pipe cutters are used.

Manufactured by

The Borden-Canadian Co.
Toronto, Canada

"BEAVER"

ROLF
GAS WATER HEATERS



No. 20 to 25 Series

are made in a modern and complete plant, the entire output of which is devoted to the manufacture of these Heaters.

We are heater experts and we make Rolf Heaters as good as they can be made.

The Rolf Heater Mfg. Co., Columbus, Ohio

W. H. Cunningham, 98 Kingswood Road, Toronto
Canadian Representative

WROUGHT PIPE

BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized
All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

Montreal Works: Lachine, Can.

Mutual Benefit Chats—No. 4

To-day we celebrate the fiftieth anniversary of Confederation. In fifty years the plumbing trade has made tremendous advances. Many useful and time-saving devices have been put on the market since then. "The Sanitary Engineer" brings these devices to the notice of the trade as soon as they are on the market. Subscribers should watch the advertising columns of "The Sanitary Engineer" closely. It is the only journal exclusively for the plumbing trade in Canada and all live manufacturers of up-to-date plumbing devices make use of its pages.

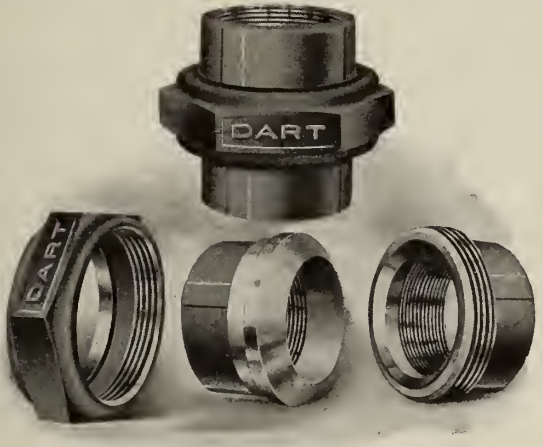
Read our advertising pages closely, they mean money for you.

Make the work you do advertise your business

Good work holds customers, and is the means of getting many new ones.

Make sure when you leave a pipe coupling job that the joint will remain permanently tight by using

DART **Dart Unions** DART



Both faces of the joint, being bronze, there is no deterioration.

The iron parts are extra heavy; they cannot stretch nor pull apart.

Another advantage of using Dart Unions is that they are easily and quickly connected, whether pipes are in or out of line.

Sold by all first-class supply houses. Absolutely guaranteed.

Manufactured by
DART UNION CO., Limited
Toronto, Canada

KERR GATE VALVES



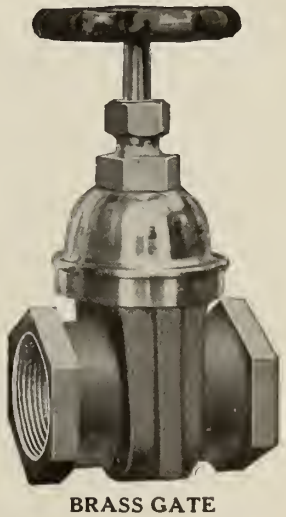
I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.



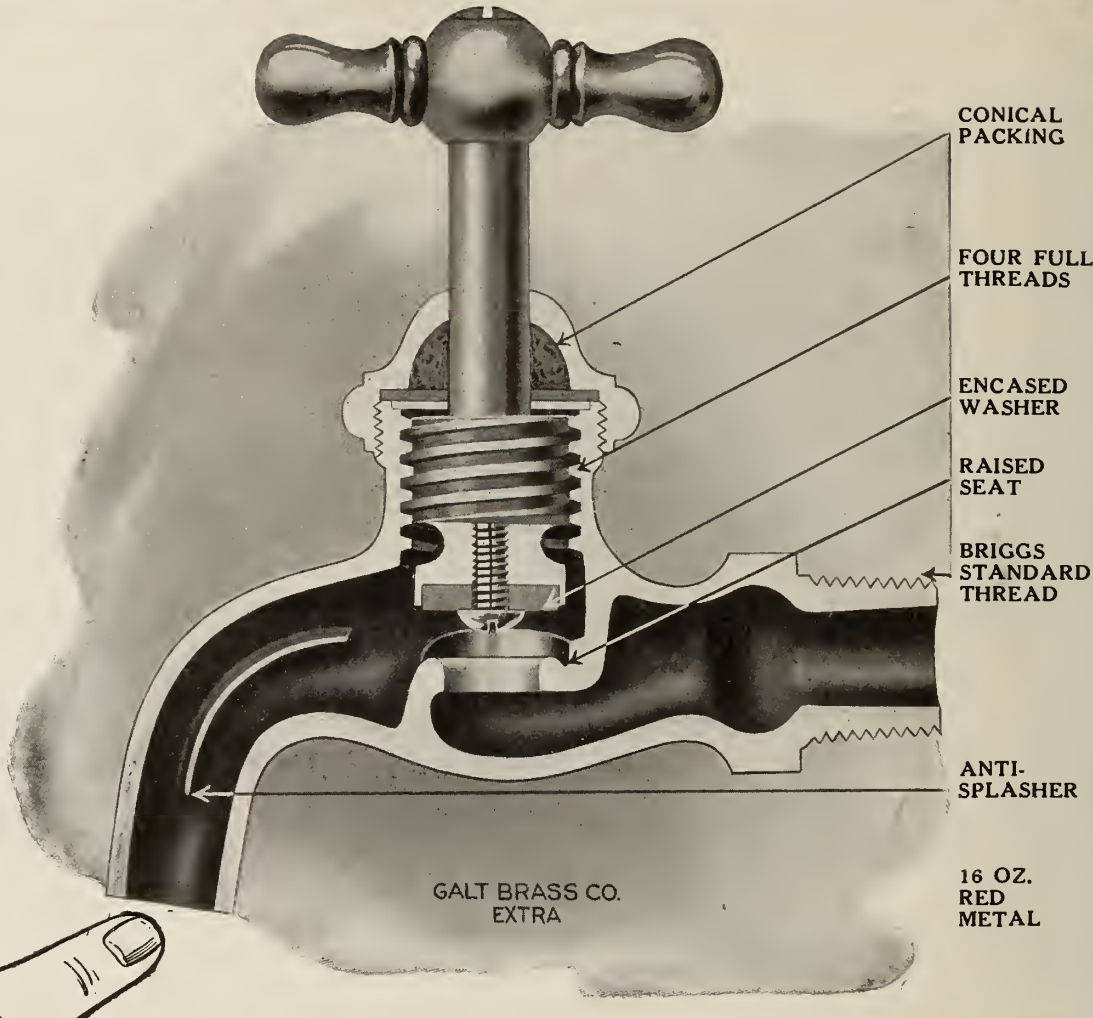
BRASS GATE

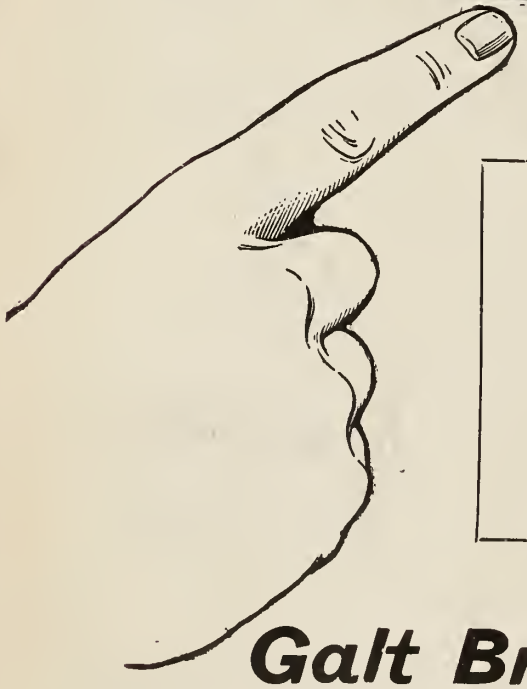
THE KERR ENGINE COMPANY, LIMITED

WALKERVILLE, ONTARIO

Registered **PERFECTO** Trade Mark

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, JULY 16, 1917 | No. 14

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Quality First

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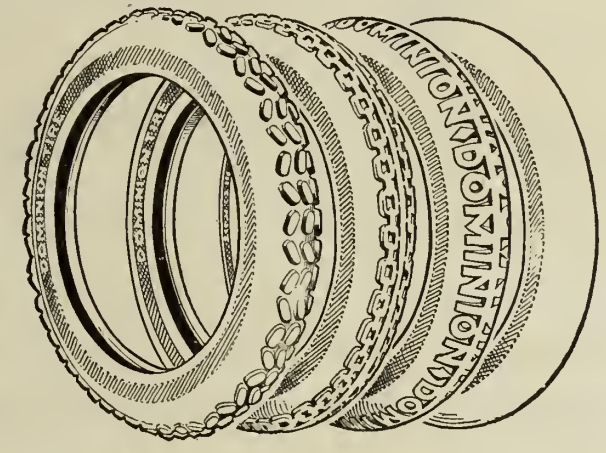
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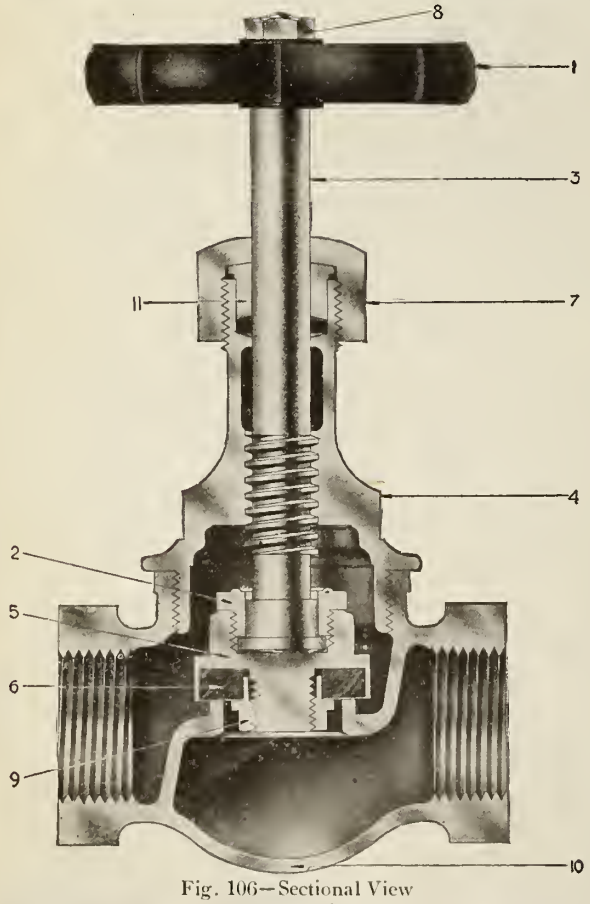


Fig. 106—Sectional View

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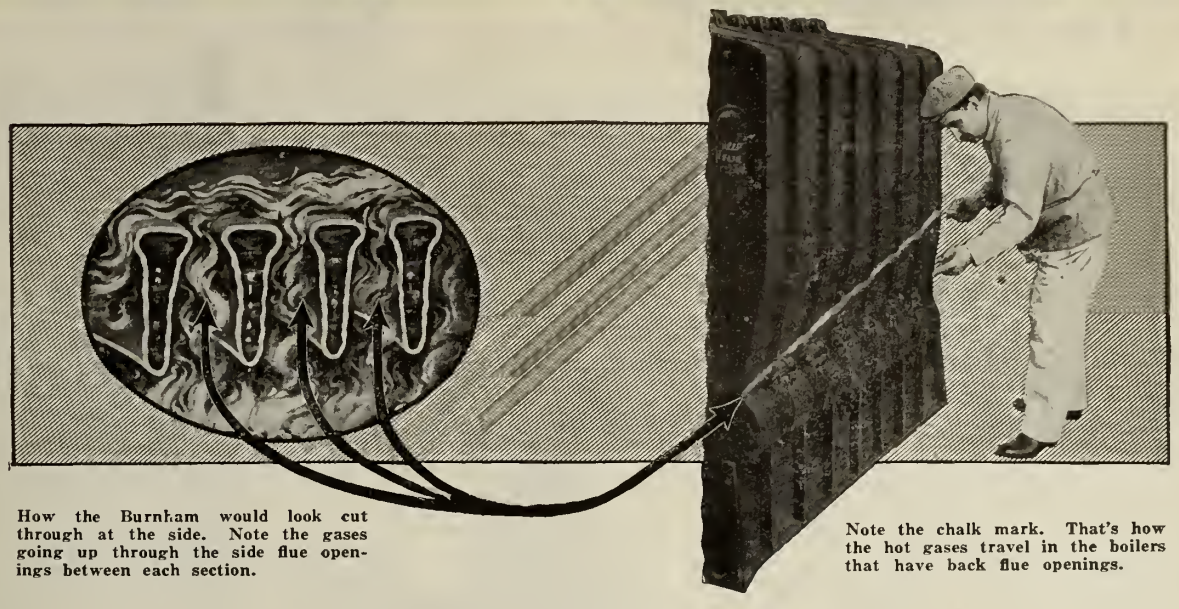
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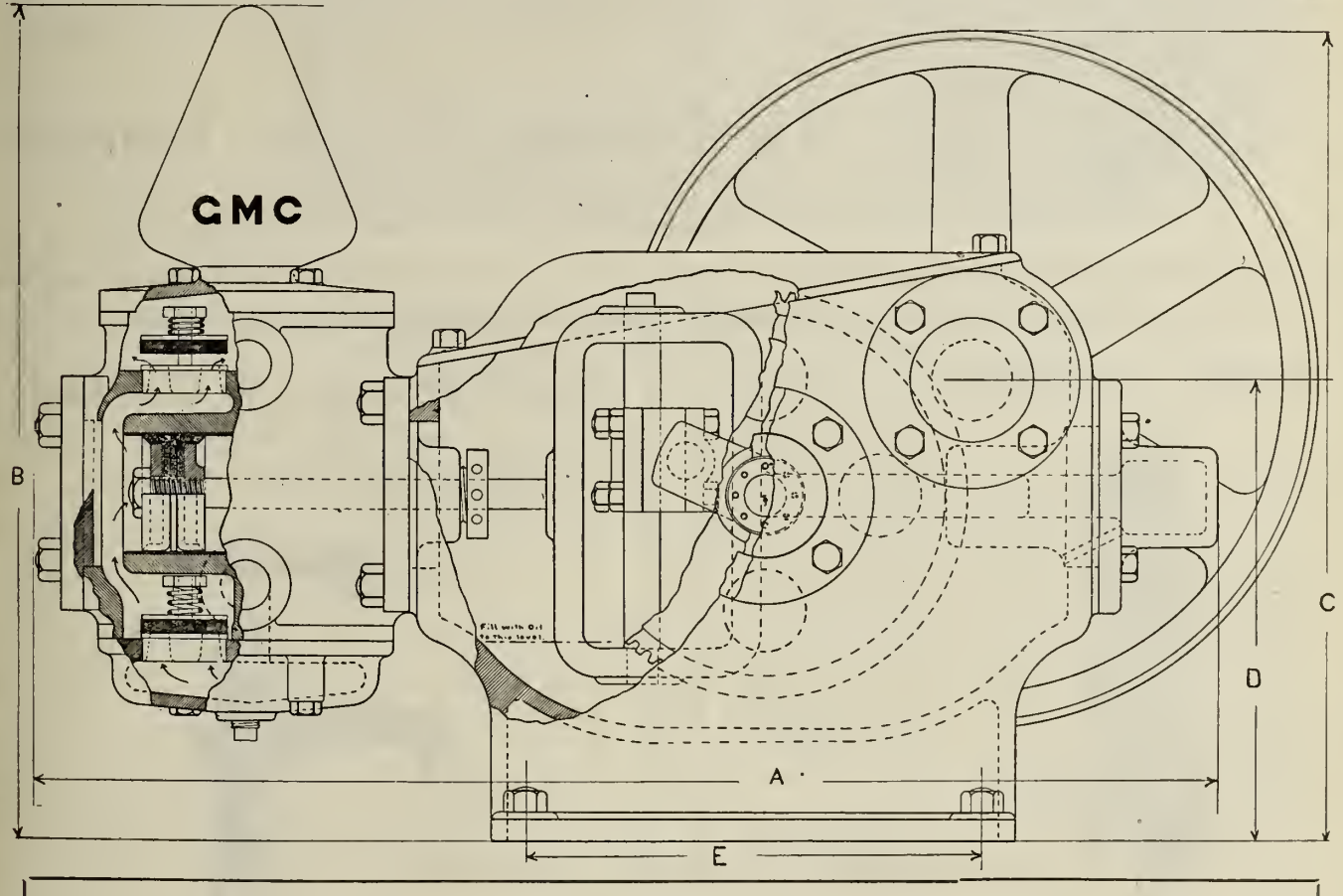
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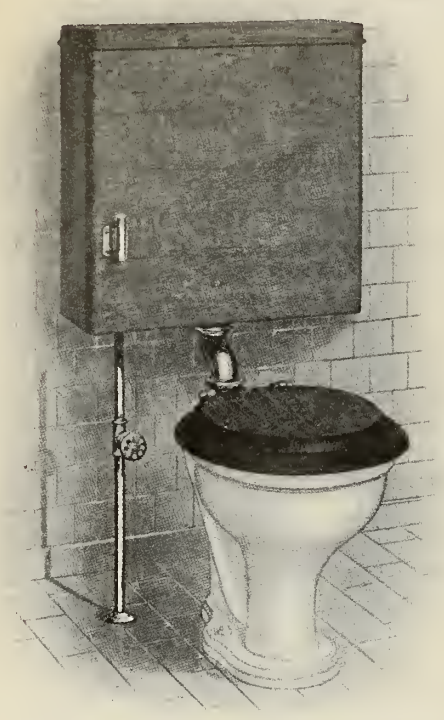
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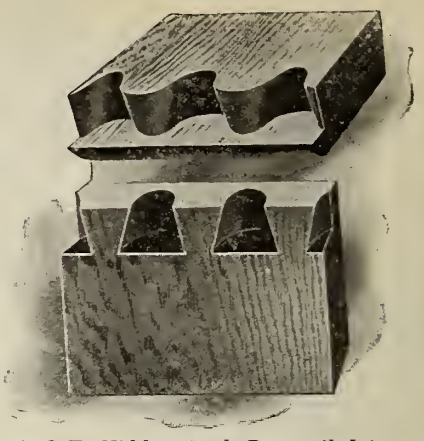
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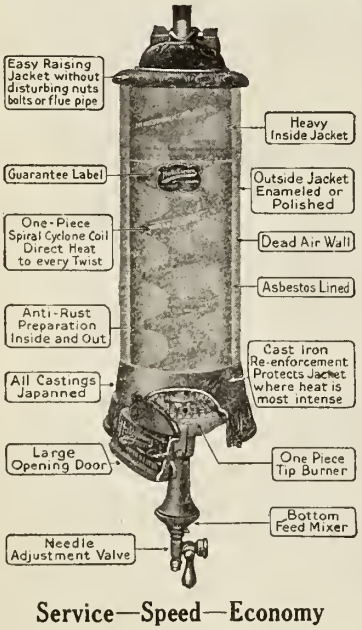
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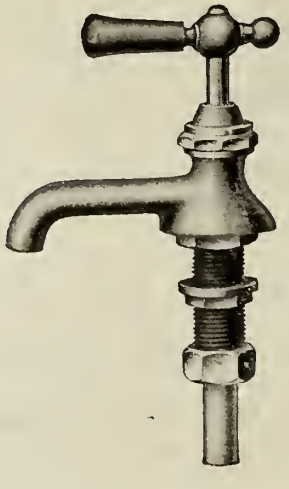
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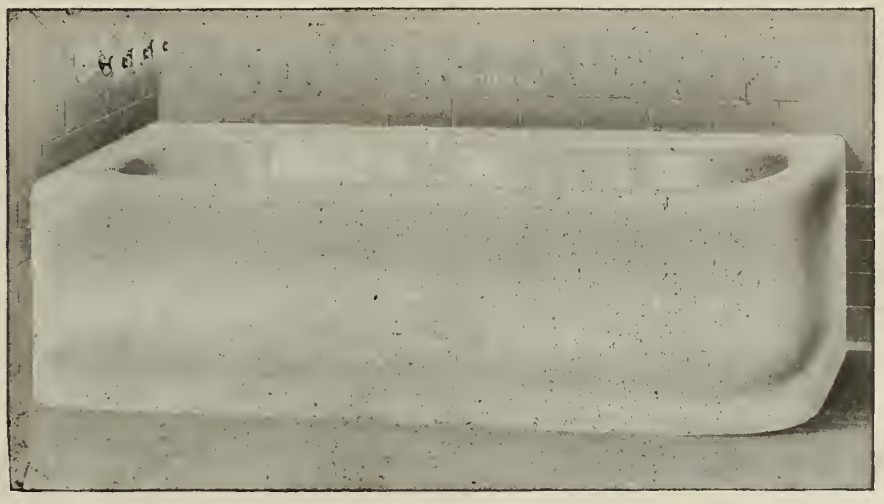
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Who never to himself hath said,
'This is my own, my native land.'"

—SIR WALTER SCOTT.

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CANADA—what history we have made in the past three years; —a name that shines in letters of gold before all the world—whose men and women from the rock bound coast of the Atlantic to the sunny shores of the Pacific have, during the terrible times through which we are passing, proved themselves capable of living up to the highest ideals imposed by Christianity.

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CANADA needs every dollar that you spend, and, of course, your duty in this respect will also be your pleasure.

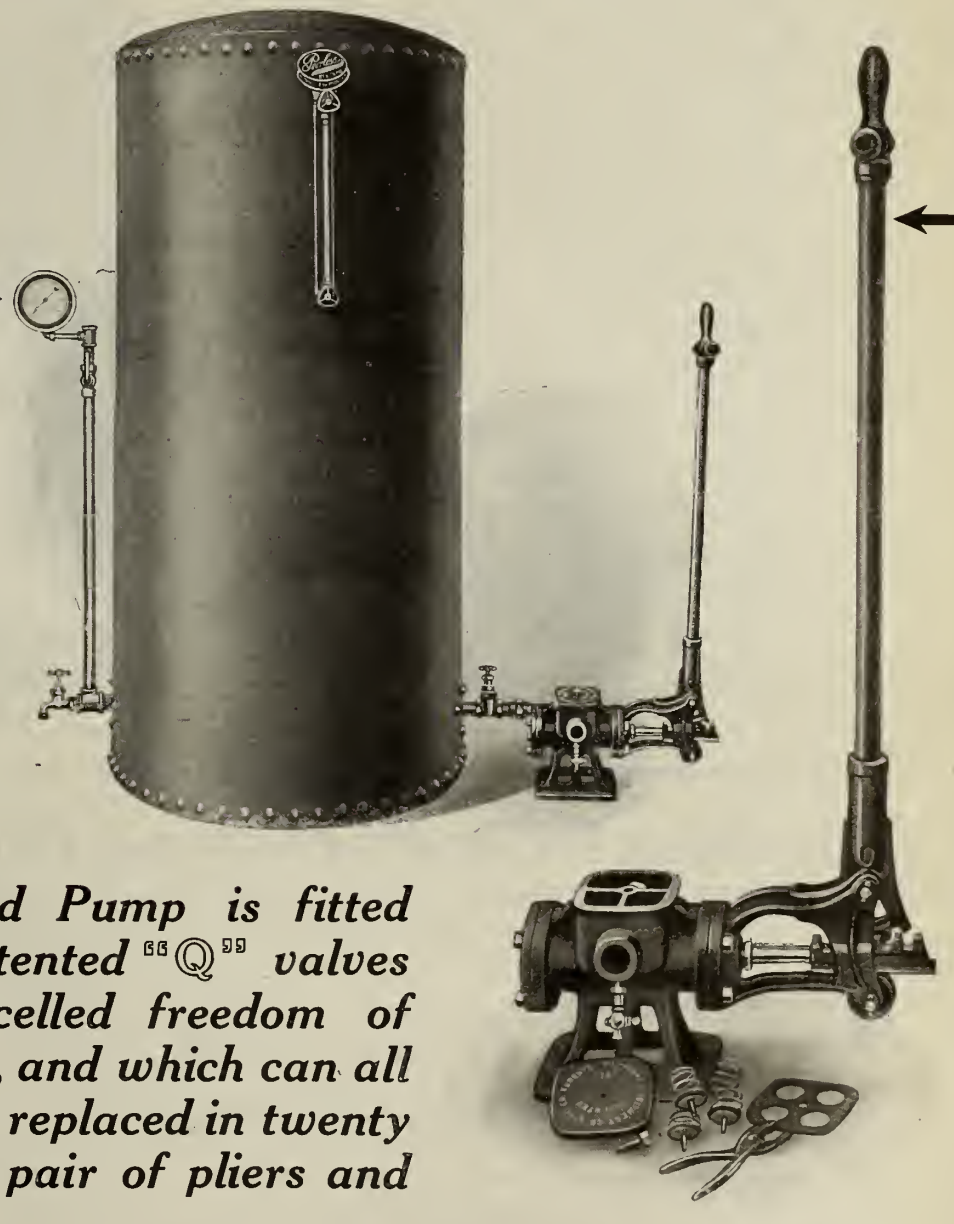
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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, JULY 16, 1917 No. 14

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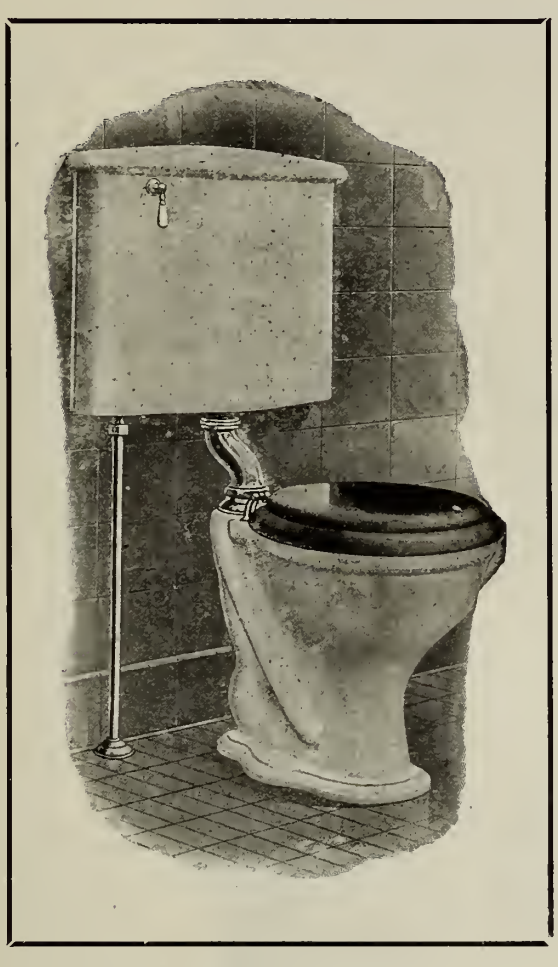
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THE SANITARY ENGINEER

VOL. XI JULY 16, 1917 No. 14

A Little History of the Craft

A Book Published in Newcastle-on-Tyne in 1824 Furnishes Some Very Interesting Information Concerning the Ancient Coat-of-Arms of the Plumbers', Pewterers' and Glaziers' Company at Newcastle-on-Tyne.

THOSE who are interested, but only as general readers, in trading methods and customs of the past, are rather apt to overlook the fact that the rule of the ancient guilds and companies was not confined to London. The collector of old silver knows that he must differentiate between the marks of London, York, Chester, and Exeter, but he probably does not stop to consider that there were skinners, and glovers, and smiths, and coopers, similarly members of a society and under the supervision of a master and court of wardens and assistants in those and other cities. His hobby is concerned with a metal that lasts.

Still, an old book dealing with provincial guilds has a peculiar attraction to any one who has a liking for records of antiquarian interest, and such a one lies before us. It is entitled "The Armorial Bearings of the Several Incorporated Societies of Newcastle on-Tyne, with a"—but the foregoing will suffice: the full title occupies seventeen lines and contains no fewer than fifty-six words. The book was written by James Walker and M. A. Richardson, and published in the Tyneside town in 1824. It is embellished, as the phrase went ninety years ago, with a goodly number of copperplate engravings, beautifully executed and printed on a fine paper which has not faded, but rather toned by age. Of these more anon, but first we would enumerate some of the more important companies. The Merchant-Adventurers, composed of drapers, mercers, and boothmen, claim pride of place by reason of the date at which their Charter was granted, to wit 1215 A.D. King John constituted the persons indicated into a society of free merchants, the members of which he exempted from pleading anywhere without the walls of Newcastle to any plea but that concerning foreign tenures. There were other privileges granted at the time, and later charters confirmed and extended them.



The arms of the plumbers', pewterers', and glaziers' companies at Newcastle-on-Tyne.

From this beginning there grew up in Newcastle a number of fraternities which comprised between thirty and forty trades, though there were fewer societies because some of them were coupled or grouped; nevertheless, each trade had its own arms. The bakers and the brewers were jointed in one society, and the armourers went in with the felt-makers and the curriers.

The Play's the Thing

The plumbers, pewterers, and glaziers, with the goldsmiths and the painters,

were enjoined by the ordinary of their society dated September 1, 1536, "to go together on the Feast of Corpus Christi and maintain their play of 'The Three Kings of Coleyn.'" The due performance every year of a miracle play appears to have been a duty strictly imposed on the members of nearly all the societies.

In the notes which accompany the engraving there are three phases that call for comment—namely the Northumbrian's innate mistrust of a Scotsman; the conduct of the apprentices; and trade customs as disclosed by the authors.

The rules of the Plumbers and Pewterers aforesaid provided that "no Scotsman born should be taken apprentice or suffered to work in Newcastle on pain of forfeiting 3s. 4d." The society in 1619 built themselves a hall, and at a later date from the centre of their meeting-room they suspended a gilded ball, which was believed to have been shot from a Scots cannon during the siege of the town in 1644. This ball was found lodged in the wall when some alterations were made, and it may be regarded as a symbol of the hatred of the Scots that existed in the English border countries.

Keeping the Apprentices in Check

What might have followed a commingling of Scots and Northumbrians in the ranks of the apprentices is hard to conjecture. As it was there were numerous rules made and enforced to maintain order among the lads, who served from five to as much as ten years before they got their indentures. In 1554 the Merchant-Adventurers got an Act passed to govern the apprentices, who were guilty of excesses in conduct and apparel:

What dyseng, cardeng and mummying, what typling, launseng and brasenge of harlots; what garded cotes, jagged hose lyned with silke, and cutt shoes! what daggers ys by them worne crosse overthwarte their backs that theis theire dooings are more cumlye and decent for rageng ruffians than eemlie for honest apprentizes!

In a word they were "regular nuts," and withal picked off the hedgerows of the town moor, for a master was prohibited from taking apprentices "born in Tynedale, Riddlesdale, or suchlike places, because the parties there brought up are known either by education or nature not to be of honest conversation;" and what, forsooth, could you expect of some "proceeding from such lewde and wicked progenitors"?

There is a curious light thrown on the custom of limiting the number of apprentices in a by-law enacted in 1786 by the Coopers, whose original Charter went back to 1426, when each brother could take only one apprentice in seven years. By the new rule it was enacted that for the enrolment of every apprentice so taken, a brother pay £10, or any apprentice at all during the servitude of another, £5.

Ten years later the Coopers' Com-Company were involved in a law suit, and by a mandamus "it was fully determined that corporations have no right to make by-laws in restraint of trade, and that a prohibition not to take more than a certain number of apprentices is a law in restraint of trade."

We reproduce the arms of the Plumbers, Pewterers, and Glaziers, and must leave the picture to tell its own-tale, remarking only that the plumbers emblazoned on their shield "two plummets azue," which seems an appropriate colour for a lead plumb-bob, and that in the base war "a bevel reversed." On the chevron two soldering irons are in saltire between a cutting knive and a shave hook. The grillelike devices on the pewterers' shield are limbecks, while the knobbly-looking affairs in the base of the glaziers' arms are grozing-irons, and the four diamonds are heraldically known as closing-nails.

From *The Ironmonger*, England.

A Proper Place for Everything

That Man is a Stranger to the Truth, or Else Lacks Practical Experience, Who Advocates the Use of Clay Tile Pipe for House Drains.

MANY sanitary engineers are there who know what clay tile pipe under building is responsible for. Sufficient evidence has been given recently in the Sanitary Engineer to make tile pipe manufacturers for ever hold their peace, but in spite of that, it is safe to say that never was such a bunch of poor deluded "side-trackers" born as these manufacturers of clay tile pipe. One would think, judging from the opposition they are trying to make that the very existence of their business depended upon their products being used under dwellings and buildings.

No sensible person wished to harm the clay tile pipe industry, insofar as it serves the public to the latter's welfare. But when that industry wishes to cling to all the business it can, although certain lines in that business have been proved a menace to the health of a community, when experience has proved that another material is better than clay tile pipe for house drains, then it is time to call a halt, it is time to act and act strenuously against the use of clay tile pipe under dwellings and buidings except under special conditions. The writer recently read a few extracts from "The clay pipe book," the illustrations in which were very interesting and showed without doubt, conditions under which clay tile pipe could be used advantageously, and at the same time be sanitary.

There is a big field in which the use of clay tile is very necessary and there always will be. No rural home should be built without a sewage disposal system and such systems are mainly clay tile pipe.

The trunk line too is of vitrified clay tile pipe and the laterals clay field tile.

The farmer should be taught more and more to use clay tile pipe in irrigating or draining his land, watering hillside or sloped areas can be done by clay pipe being laid in many ways that will distribute water to the roots of all kinds of farm products. There are thousands and thousands of uses which tile pipe and clay products can be put to and the demand for it is ever increasing, and legitimately so. Therefore why advocate the use of clay tile pipe where practical experience has long ago proved its unfitness? Such a stand is sure to work harm to the industry as a whole.

The writing of articles that are specially prepared to mislead those who know no better, is an imposition and although the articles that have appeared from time to time in The SANITARY ENGINEER specially state that clay tile pipe is not the fit pipe to use under dwellings, they must not be taken as condemning the use of clay tile pipe for any and every purpose.

There is a right place for everything, just as well as a wrong place, and tile pipe is certainly in the wrong place when installed under dwellings.

JOURNEYMEN'S ANNUAL PICNIC

We are informed that the Journeymen Plumbers, Steam and Gas Fitters of Local Union 46, will hold their annual picnic on Saturday, July 21, to Grimsby Park. There is a splendid programme in preparation and if reports are to be relied upon, the event bids fair to be a real bumper one. The boat leaves at 8 a.m. The management request the present of as many of the employers as possible, along with their families. Adults' tickets, 75 cents, children 30 cents. "Come along and have a good time," says Bill Storey to everyone.

Main House Trap and Breather Problem

No Subject Has Proved More Interesting Than That of the Main House Trap and Breather—We Publish Herewith a Few of the Many Replies We Have Received in Answer to a Number of Letters Recently Sent Out.

THIS series of articles should prove very interesting as well as educational to every sanitary engineer in Canada, and as we are publishing the replies that have been sent in from all parts of the Dominion, the information will be valuable.

In the first place, we should explain that the main house trap and breather was found necessary a half a century or so ago, when at least two conditions existed.

First, it was taken for granted that sewer air was deadly poison. How did this opinion arise? In this way: If a person came into contact with an obnoxious odor, that person would at once say, "This is a bad odor, it must be dangerous." Some would not detect it and would not be affected by it, so that it was at once proved that all odors that were obnoxious were not necessarily poisonous or dangerous. Of course, we must not infer by this that an odor that is obnoxious to one person would not cause that person to become indisposed. For example, let us take the odor of fresh paint. Many persons cannot bear it, and such an odor will, as we all know, very often cause them to be very sick. The same will apply to the odor from bananas, but neither of these odors are really poisonous. The writer at one time could not bear even to look at tomatoes and to see anyone eating one would at once cause his stomach to turn. Since, however, coming to this country, the very reverse has been his experience.

These examples are shown just to prove that while sewer air is by no means dangerously poisonous, it is not desirable, nor should it be allowed to enter into one's home, or into a building occupied by anyone. It must not be inferred, however, that sewer air if not obnoxious would not be dangerous, because the odor of sewer air is really not the danger, but it is, to a certain extent, the warning of danger.

How, it may be asked, is the dangerous kind of sewer air created? Simply by sewage becoming putrid, and giving off of bad air. Sewers that are properly ventilated would not contain dangerous sewer air. Therefore, we conclude that all main sewers, or branch sewers should be ventilated, and should be so laid as to have no portions in the line of sewer pipes or drains that can hold solids which could in time become putrid. It is poorly constructed sewers that cause many of our health departments to cling to the main house trap and breather.

EDITOR'S NOTE.

As explained in last issue, the out-of-date main house trap and breather has to be reckoned with. We are making history, and if progressive methods are to be the order of the day, the main house trap and breather must go.

It belongs to the past, a past with poor drainage systems, main sewers badly laid out and a hundred and one of the evils that are not now in existence in newly planned towns and cities. No doubt there is a need for main house traps and breathers where certain conditions exist. But to make its use compulsory under all conditions, is to make it a menace.

Every plumbing by-law should be so worded as to only allow its use where it can be shown to be a necessity. But by no means should its use be enforced because of existing evils.

Rather should the evils be eliminated than perpetuate an evil that at some day will have to be reckoned with.

Now, in the first place, the trap is inserted in the house drain to prevent sewer air from the main sewer entering into the soil and waste pipes of the house.

Next, the breather is connected, as we all know, in order to keep the air pure in the house drains, vents, and soil and waste pipes. So far so good. Now, suppose some one were to advocate dispensing with the breather, what would be the result? Just the same as is taking place in our main sewers—the house pipes would not be ventilated, and the air in them would become foul and very likely dangerous. Then we would argue that if the house pipes require to be ventilated, and a breather is desirable, why not still continue the good work and extend the good work by ventilating the sewers?

Let us ask our readers another question. Suppose we agree for the present that all main sewers be properly

WHAT IS YOUR OPINION ?

Dear Sir--

For a numbsr of yesrs tbe question of using s msin house trap and brsather on sach privsts branch drain from s dwelling or building, between s housa drain and ths msin sewer, has been under consideration. Many favor ths main houss trsp snd braather,whila soma favor dispensing with both.

Tha following are a numbar of questions relating to tha suhject, answers to which will hs greatly apprecisted, and if time will parmit, a rough sketch will also be welcomed.

1. Are you in favor of ths usa of s main house trap and breathsr ? If so, why ? .....

2. Are you in favor of dispensing with the main housa trap and breathar ? If ao, why ? .....

3. What is tha law rsgarding above subject in your locality ? .....

Signed.....

Addrsss.....

We should be thankful to live in this age of reason and science—

ventilated (and the writer is of the opinion that all will agree on that point), how must these main sewers be ventilated, and how must all the piping between the main house and, say, the man holes in the street and the top of all or any ventilation shaft be ventilated?

Those advocates of the main house trap and breather appear to forget that if an absolutely perfect system of sewer ventilators were installed that would ventilate every inch of pipe between the main house trap to all terminals, that every one of those trap seals would become broken, simply because there would have to be a passage of air through that portion of the house drain from the trap to the sewer. So that it is easily seen, that while we agree that sewers should be ventilated, in which case the air in the sewers would be perfectly pure, yet the adherents of the main house trap and breather cling to a theory on the one hand and discard it on the other.

However, as we wish to give our readers a few of the replies to the questions asked, the letter is here reproduced, and the replies to the questions as numbered 1, 2 and 3.

A Reply from Calgary

A reader from Calgary writes as follows:—

1.—No, I am not in favor of the main house trap and breather, because the flow is retarded, and solids lodge in the trap; thus trap becomes choked.

2.—Yes I am. So that a free circulation of air may be had through the street sewer as well as the house drain in an upward direction. The house drain should be of iron inside of building for either system, but especially should this be so if this trap is dispensed with.

3.—Main house traps are not permitted except in very special cases. When permission must be procured from the plumbing department.

A Reply from Dartmouth, N.S.

1.—I think the main house trap and breather serves the same purpose on a drainage system as the fifth wheel would on a wagon. It is simply used because our grandfathers favored it, and some of our plumbing ordinances demand it. If the cost of this item were applied to furnish a better quality of brass goods and fixtures on such jobs, I think it would prove very much more profitable to all concerned.

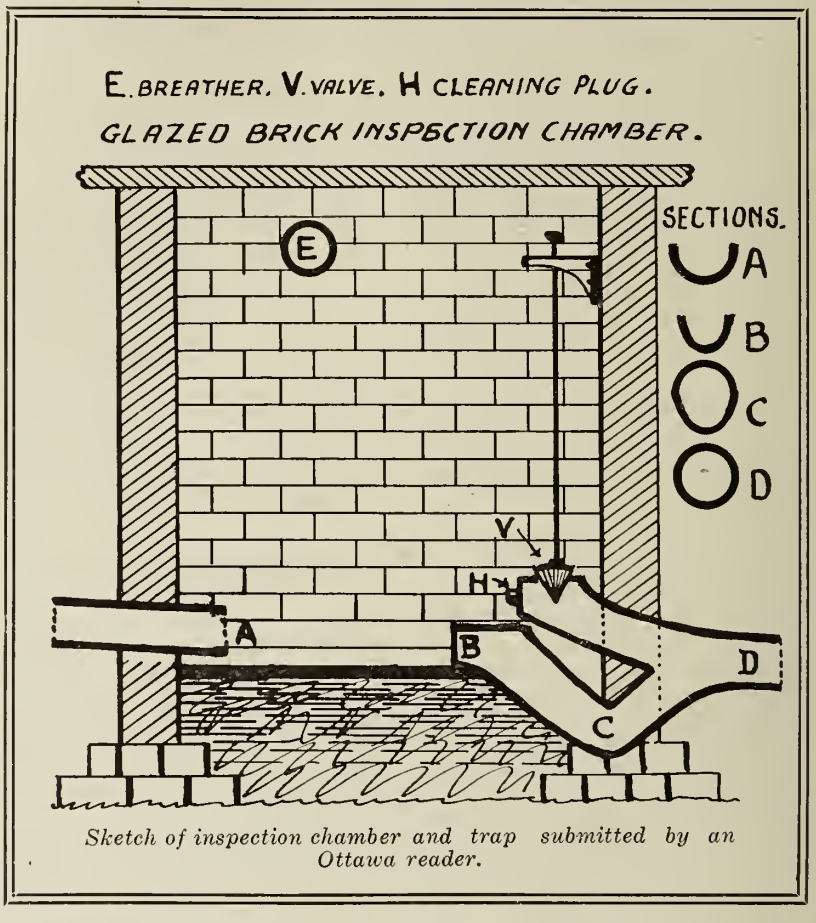
2.—I fail to see how it serves any useful purpose on a plumbing job that was executed by a competent and careful workman. If the admission of pure air to drainnge pipes is so very necessary, which I have no doubt it is, I think it is a great mistake to stop at the foundation wall and allow the air in the pipes outside to become foul and polluted.

3.—The plumbing regulations about here call for the abovementioned trap and breather, and echo answers, WHY?

A Reply from Ottawa

1.—Yes, I am in favor of a trap and breather, but consider that such should be outside the house, in a brick or concrete inspection chamber, glazed brick preferred, as per rough sketch enclosed (See sketch accompanying this article).

To answer why I am on favor of the main house trap and breather would, I fear, occupy too much of your valuable space.



Sketch of inspection chamber and trap submitted by an Ottawa reader.

We might say that we would be only too pleased to place all necessary space at the disposal of this reader. We do not feel that the question has been discussed as freely as it could be, and we shall therefore be pleased to give space for the expression of all those having an earnest opinion on the subject.

(Continued in next issue)

$28,000 PLUMBING SUIT

F. G. Mitchell, manager of the London Engine and Supplies Company, is commencing action against Sir Adam Beck for breach of contract involving a loss of business amounting to $28,000. It is alleged that Sir Adam refused to permit business to come to Mr. Mitchell's firm on account of the personal opinion of Sir Adam toward Mr. Mitchell.

The firm of Eggett & Co., plumbers, was awarded a contract for plumbing and heating at the Byron Sanatorium. The job amounted to a large sum and the tender of Eggett & Co. is reported to have been $2,000 below any other.

The Eggett company let the contract for supplies to the London Engine and Supplies Company, and the stock is said to have been secured prior to proceeding with the work.

About a month after the contract was let, Eggett & Co. received word that they could not have the work, and it was reported that Sir Adam Beck's personal antipathy and resentment toward Mr. Mitchell was given as the reason.

Mr. Mitchell wrote a letter to Sir Adam Beck, asking the reason for the cancellation of the contract, and he received a reply in which it is reported that violent language was used, and Mr. Mitchell was informed that no firm with which he was connected would ever be given any business by Sir Adam Beck, who said Mr. Mitchell had been an opponent of Sir Adam's hydro electric policy, and for this reason was outside the pale of all Beck concerns, and would never get a cent's worth of business.

Mr. Mitchell wrote a letter of protest to this attack, and bespoke his right as a citizen and business man to be treated fairly. The protest had no effect, and the contract was cancelled and given to another firm.

The loss to the firms involved will be stated, and a considerable amount of damages, at least $10,000, will be asked for. Mr. Mitchell has given instructions on behalf of his firm to have the case proceeded with immediately.

The Evolution of the Vacuum Cleaner

The Vacuum Method of Housecleaning Was Realized as a Necessity as Far Back as 1869—Once Looked Upon as a Luxury, Now as a Necessity—No Home or Building Can be Effectively Cleaned by Any Other Method.

IT may not be generally known that as far back as the year 1869 there were men who were thoroughly convinced that to properly clean a dusty home, office, or factory, some form of suction machine was necessary, and between that year and 1901 many patents of various kinds were granted for such machines. It may, however, be said with no small degree of certainty that most of the failures (and there were many) were due to the fact that every inventor felt that what is known as a high vacuum was necessary.

Not very many years ago it was a common thing to hear of some manufacturer declaring that his machine was so powerful and the vacuum so high that it would pull dust and dirt through the carpet, etc., and even at this date there are some who still believe the necessity of a high vacuum.

Those men, however, who have given the question sufficient serious study, have long since proved that such is not the case; that it is rather a matter of "air volume" which will displace the largest quantity of dust.

It is a well established theory that no vacuum is necessary or advisable that will pull dust through a carpet, because by so doing a carpet is very soon destroyed, and actually has been destroyed in thousands of instances. Dust particles do not require very great power to lift them from the floor or wall. Why then go to the trouble and expense of making high vacuum machines that would not displace quantity, when low vacuum and quality is really needed?

Then again to maintain a high vacuum very large machines would be necessary to produce the quantity of air required to clean any great area as quickly as a broom would take to apparently clean the same area.

Such appliances can now be found in thousands of homes on this continent, particularly in large towns and cities, and those who have them would not be without them for twice their cost.

The most popular type of machine used is the portable one, but it has its drawbacks in that the dust receiving bag has to be disconnected to clean the dust out after the machine has been used a few times, but these are much more sanitary than the broom; in fact, the day is not far distant when the broom will be very little used in those towns and cities where electric current can be procured.

The portable cleaner was the most recent invention put on the market, excepting, of course, the cumbersome hand driven suction cleaners. These latter, however, are almost an unknown quantity in some districts, but at the best they require much more manual labor to operate them than the broom, and we are all very well aware that the vacuum cleaner must not only clean efficiently, but the operation must not be laborious. The housewife or caretaker's work must be lightened.

At first the champions of the stationary cleaner looked upon the portable cleaner as a keen competitor, but experience has proved the reverse. When once a person has used a portable machine for any length of time, and has realized the advisability of our cleaning machines. They are much more easily convinced of the need to have their home or building piped with iron piping and wired for current than is the person that has not used any vacuum cleaner at all. These conditions have resulted in many houses being piped ready for the time when the cost of the stationary machine could be borne.

Many sanitary engineers have not only become agents for portable machines, but have a number of them in stock for the purpose of loaning to their customers, and have found the business derived therefrom very profitable; in several cases, we are told, these customers have had stationary cleaners installed.

In Canada, the outlook for the sale of stationary cleaners appears to be very encouraging, and the proper men to do this business are without doubt the sanitary, heating and ventilation engineers.

Speaking of ventilation, it might be said that the stationary cleaner is also a splendid ventilator, because when in operation it must create a certain vacuum in a buliding which will decrease the resistance to the outside air, and in this way increase the "air change" in the interior of a building. This is not the case, however, with a portable cleaner, because while the former exhausts the air into a chimney, the latter simply draws the dust into a bag and the air must escape through the canvas bag.

There is also another use to which a stationary machine can be put, that of using the exhaust as a force blast. In a certain large institution where two very large machines are in operation, this has been done, and found to effect a great saving in fuel, giving off a much quicker heat.

These stationary machines can be used to clean out the furnace, both flues and ash dust, and can be used in many ways to keep dust down in a buliding, whether residence, office or factory.

An Earnest Appeal to the Trade

WE cannot let the time go further by without commenting upon the loss to the plumbing and heating trade of so many men engaged in this business before they took up arms against the Prussian menace.

We feel that while so many have made the supreme sacrifice, we here at home should not forget that there will be hundreds of men who have become maimed for life in body, but in mind will be stronger men than ever.

After all the body is but a piece of physical mechanism and the mind, the brain and the ability to put ideas into operation are very important factors in our work. We feel that there should be some concerted efforts made to bring our disabled comrades together in such a way as to make them independent of all that smacks of charity.

Why not have members of the trade in each town called together to discuss this matter?

Let some one person in each town or district take the reponsibility of calling such a meeting and discussing what measures could be instituted, and let the conclusion arrived at be communicated to the SANITARY ENGINEER for publication, so that each would be able to read the opinions of the others, and to decide upon a definite plan to be carried out.

The following is a suggestion for a resolution that could be sent to the Dominion Government for consideration:

Resolved that the Federal Government be asked to bring pressure to bear upon the various Boards of Health to institute a plumbing inspection department either provincial, county, district or municipal. That none but practical men be employed as plumbing inspectors, and that preference be given to returned soldiers who previous to enlisting for service overseas were actively employed in the art of sanitary and heating engineering construction.

Still further preference might be granted to men of experience who are so incapacitated at to be unable to follow their regular employment.

(Continued on page 39.)

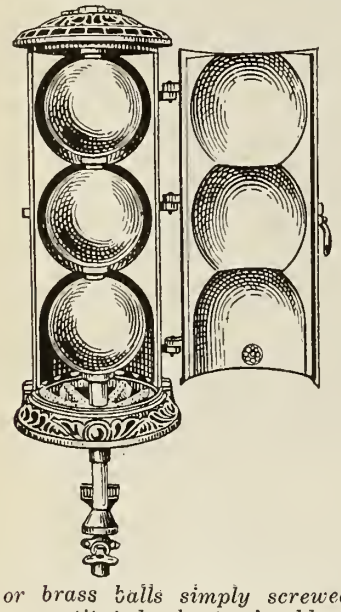
Every hour brings something new; some new thought, some new service—

Evolution of Gas Water Heaters

Being a Synopsis of the Progress Made in the Manufacture of Gas Water Heaters—A Splendid Field Which Most Sanitary and Heating Engineers Appear to Have Passed up and Forgotten.

PROBABLY the earliest method of heating water by artificial means was that of digging a shallow hole in the ground, filling it with water and then rolling heated stones into it.

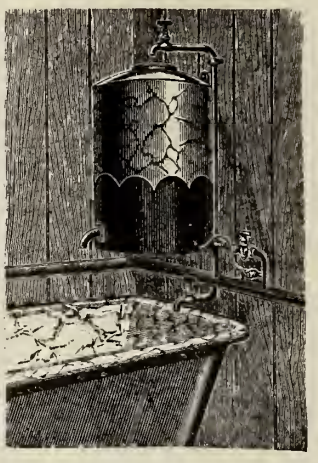
After Windsor in 1805 exploited his plan to "Extract Inflammable Air from Gas," and use it for illumination, an Englishman named Robert Hicks in 1825 took out a patent for "heating water in bottles by means of spirits of turpentine and carborated hydrogen gas in chambers in the bath, or tubes passing through or under them."



Iron or brass balls simply screwed together constituted a heater in olden days

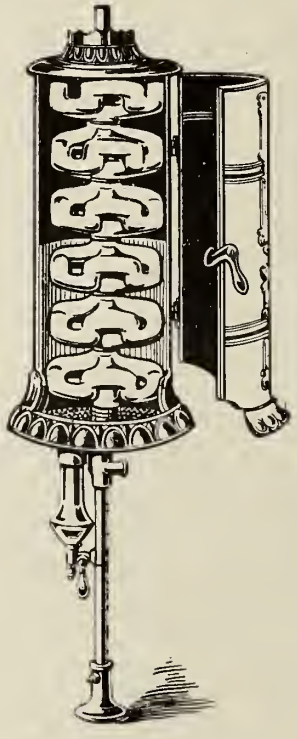
Gas was originally used for illumination, but when the process of manufacture cheapened to such an extent that it could be used for fuel purposes, the gas range made its first appearance. With the invention of this appliance it was not long before its value was evidenced, and the manufacturer of gas ranges was undertaken by many stove foundries. With the constant uniform development of gas ranges, they were introduced in many places as an auxiliary cooking appliance principally for summer use. The question at once arose as to what means could be adopted to produce hot water when the coal range was not in service. This condition caused many experiments which finally led to the development of the gas water heater.

The first method used, although very crude, was partially successful. A water back was attached to the gas range by extending a coil of iron pipe around, or placing a casting over the top burners.



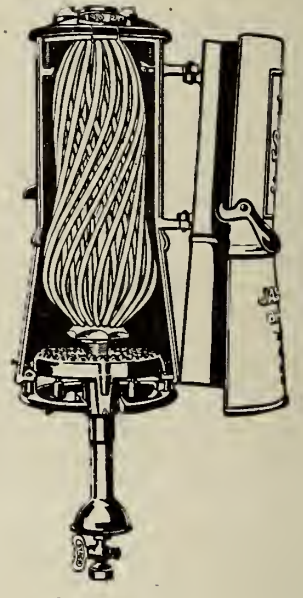
A hot water heater that was really nifty a few years ago

The heat from the burners accomplished two purposes at the same time, heating water and cooking. The manufacture of this type of heater, however, was discouraged for various reasons, among which were inefficiency, excessive cost of operation, length of time required to heat the water, impaired circulation, and loss of radiation due to obstacles encountered in the location of the heater relative to the kitchen tank.



Iron gas water heater.

When this method was proven unsatisfactory, an attempt was made to heat water by applying a burner or series of burners directly beneath the storage tank. In 1867 the typical appliance in use consisted of a cylinder tank with the cold water entering at the bottom, while the hot water was drawn from the top. A cast iron burner ring with some fifteen small ports, was located about three inches from the bottom of the tank, both burner and tank being encased in a copper jacket with air space between an inner and outer casing. Means were also



Modern and novel type of copper heater.

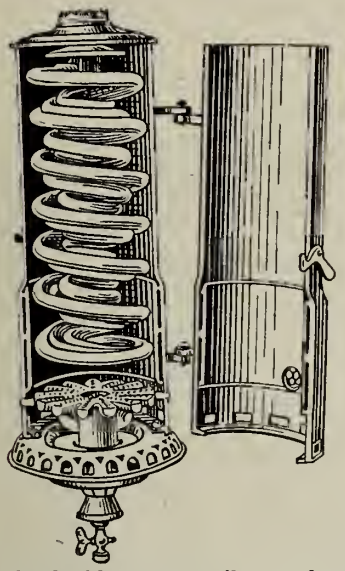
proved for the connection of a flue pipe about 2½ inches in diameter at the top of the heater to carry off the products of combustion.

The length of time and expense necessary to heat the entire contents of the tank when only a small amount of water was needed made this type of heater likewise unpopular.

After a great deal of experimenting a scheme was devised which was the forerunner of the independent circulating tank water heater. In this device a small column of water was heated and circulated. Then by-passed through a vertical pipe at the top of the tank, where it remained in strata over the cold water. When this method was found practical, one of the first problems to contend with was—what material should be used as a water conductor, and what construction should be adopted to produce the greatest efficiency.

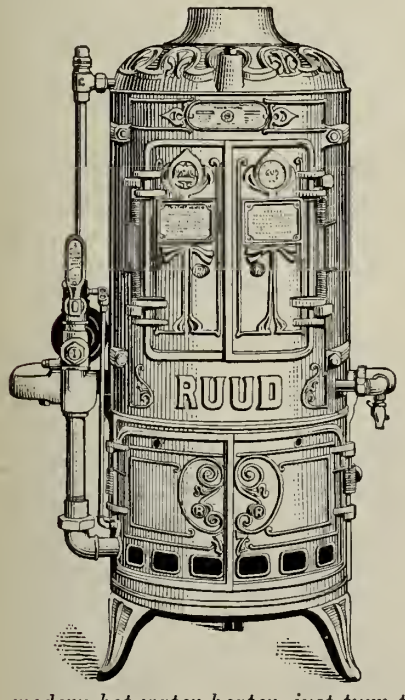
As far as can be learned, the first cir-

culating or tank water heater appeared in the United States in 1883, and consisted of a number of horizontal pipes encased in a sheet iron jacket, and though not very efficient, it was far in advance of any previous types. Following the introduction of this heater several different styles came into vogue, being constructed of similar material, but containing a variety of shapes in the water carrying parts.



Note the double copper coil, a modern gas water heater

The development of gas water heaters was slow until the discovery of natural gas in Western Pennsylvania. This tended to revolutionize the water heater business, as the great obstacle of expense was largely overcome, natural gas being sold for from five to twelve dollars per year in unlimited quantities. Several years later, manufactured gas became cheaper and the gas water heater became more generally used.



A modern hot water heater, just turn the tap, that's all

From 1890 to 1900, heaters were, as a rule, constructed with sheet metal jackets surrounding a series of water conductors of iron pipe. It was found, however, that these iron pipes were in many instances responsible for rusty water. To overcome this objection brass was used with much better results, followed by the use of copper coils, about the year 1897, at which date the single copper coil came into existence, and even at this date copper coil heaters seem to be the most universally used, single and double coils in many cases being used, while other types of copper pipe water ways are, too, becoming very popular.

It might, however, be said that the types of water heaters having the first real commercial success were those made up of either iron or cast brass water bearing sections. One manufacturer installed the water heater within the boiler, so as to eliminate the loss of heat by radiation, and it is strange to note that at this date, 1917, there are very few gas water heaters, if any, that are fitted with a casing that does not waste a lot of heat.

The next real step taken, however, to improve gas water heaters was when the cast iron casing was adopted, followed by a coil within a coil, or what is known as the double coil heater, this was about the year 1905. Then these cast iron casings began to be improved; parts, too, were made more accessible until to-day the work of taking a modern gas water heater apart involves only a few moments of time.

A Splendid Field

Much has been said of the profits that can be earned by the sale of gas water heaters by sanitary and heating engineers, and much more no doubt will be said as time goes on. One thing is very evident, and that is that the business is to some extent split up between gas companies and hardwaremen, and for some reason or other, the plumbers and sanitary engineers do not cater for this class of business as they should. There are many sides to this question, but it all comes back to the fact that those men who install piping in our buildings are logically the men who should sell the gas heating appliances. No house should be built these days without being piped for gas, simply because it really is the only dependable fuel that can be procured at a moment's notice. That is, of course, where gas can be procured at all. For both light and fuel it is almost indispensable. It is certainly dependable at all times, and is not cut off during lightning storms as is, and always will be the case more often than not with electricity.

Then there is the question of the sale of gas water heaters being a spring time selling commodity. Why should this be? There is no reason in the world why such an appliance connot be sold and installed at any season of the year. Gas water heaters can be used for heating garages and small hot-houses, and for auxiliary house heating systems. They can be connected to the ordinary hot water or steam system and used to great advantage in spring and fall of the year, the connecting up, too, is a very simple matter. With the present scarctiy of coal this class of work could be put to good account, and in that way the gas water heater would be brought into more profitable and general use the whole year round.

New Canadian Patents

No. 175,985.

Elmer Sylvester Stack, West Somerville, Massachussetts,U.S.A., 27th March, 1917; 6 years. Filed 14th September, 1914. Receipt No. 243,112.

Claim.—1. A valve controlling apparatus comprising in combination with a valve, an actuator for said valve operable by fluid pressure, a conduit leading from said actuator containing fluid adapted to transmit pressure, and separate devices remote from said actuator each connected with said conduit and each independently operable for causing application and release of pressure to such fluid.

2. In combination, a conduit, a valve controlling the quantity of fluid passing through said conduit, a pressure operated actuator for moving said valve, means for conducting fluid pressure to said actuator for producing motion in the latter, and a plurality of manual controllers connected to said pressure conducting means at respectively different points for applying pressure impulses to the pressure transmitting fluid therein.

3. In combination with a heat regulating device for regulating the amount of heat furnished to a water heater, two or more controllers operable manually, each of which is located near a tap from which hot water is delivered, an actuator for said regulating device, and frictionless pressure transmitting means between each of said controllers and said

(Continued on page 29)

A Glimpse of Canada in Light of 50 Years

The Progress of the Past Half Century From a Small and Struggling Group of Colonies Into Nationhood—Some Incidents of the Past Years and Their Bearing on the Present—Outstanding Items in the History of Canada's Development—How the Record of the Past is a Promise for the Future.

THE passage of fifty years does not bulk very large in the retrospect of history, yet this lapse of years, compassed by the lifetime of a man, means much to any country. To Canada it has meant the growth from a small and struggling colony into nationhood. The transformation of a country, cut into fragments by great stretches of uninhabited lands, and separated league after league by almost pathless wilds into a unified whole, united in interests, in feelings and in the interchange of commerce, and welded firmly together by the steel rails of progress.

There in the council chamber fifty years ago sat a group of men discussing the question of the name for this new country that was being born, and whose possibilities were beginning to steal in upon their imagination. Perhaps it was this that turned them from the old time worn and time sullied names of nation and Empire and kingdom to seek some newer, fresher title unsoiled by abuses of old times. Perhaps it was the inborn vision of a country lapped by three oceans, of great rivers opened for navigation, of a trade stretching to the farthest confines of earth that called to the mind of one of those present the great words of "Holy Writ," and in the stillness the Hon. Samuel Leonard Tilley quoted "He shall have Dominion from sea to sea, and from the river to the ends of the earth." Dominion from sea to sea! Canada had found its name.

How well the years have born out the vision of the fathers of Confederation even a cursory survey will readily show.

Material growth may not be the truest sign of greatness, but it is a tangible evidence that is indicative of many things, of a new country of course, of a country where democratic principles prevail; for autocracies do not double their population in fifty years, of an energetic people reaching out for a greater advance a wider vision, both in material things and in those intangible ideals that make for a great Dominion.

Fifty years ago when the fathers of Confederation were gathered about the council board, this was a far different country from what it is to-day. To begin with it had only a population of three and a half million souls against a present population of slightly over eight million. More than three quarters of these few millions were gathered within the comparatively small confines of the provinces of Ontario and Quebec. Four out of every nine persons lived in the province of Ontario and three out of every nine in Quebec.

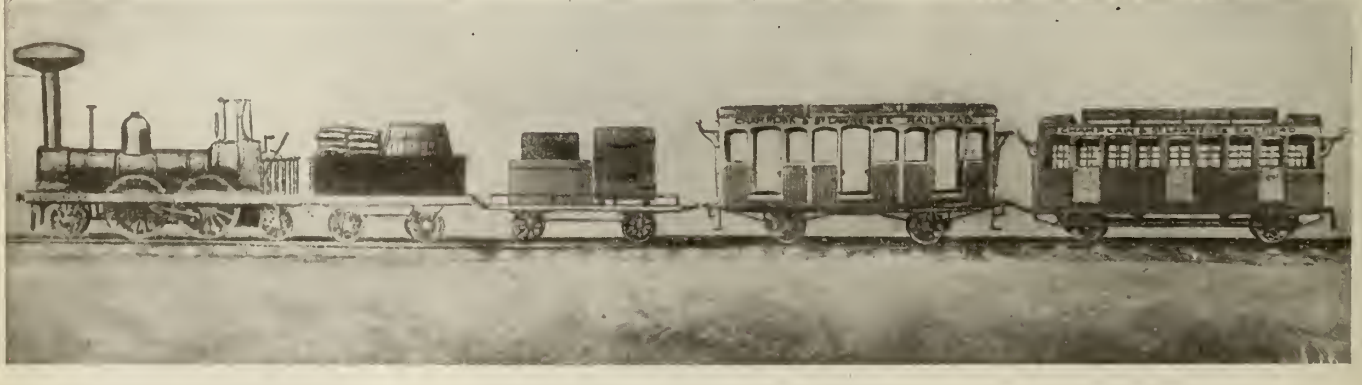
When the West Was the Great Unknown

West of the Great Lakes was the vast unknown, a few wandering trappers a few factors of the Hudson Bay Company in isolated posts dotted that immense stretch of country. Even in Winnipeg one of the great trading posts of the company, then known as Fort Garry there were less than 300 souls, while in all the enormous stretch of mountain and prairie land there was only a total of some 100,000 people, whites and half-breeds. These were scattered over the whole sweep of that immense country, at trading posts, in fishing villages and lumber camps of the Pacific coast.

The Ebb of the Gold Rush in British Columbia

Of all the great country west of the Lakes, British Columbia was the only portion that could be said to be settled. Rough, uncouth settling it was, the settlement that follows the cry of "Gold;" for it was the discovery of Gold on the Fraser that led to the influx of thousands of gold seekers, rough men, but the stuff of which pioneers is made. Into the mountain wilds of Western Canada they came following that "Will O' the Wisp" of fortune that has always had its power to draw men; to give to the Canadian west its first real impetus. For a few years the fever burned hotly, gold there was, and men drifted up and down the great streams hearing tales of a fabulous wealth, there for the finding. Gold there certainly was for in 1863 upwards of four million dollars worth of gold was taken from the Fraser and Thompson valleys. A fabulous sum in those days before the world had begun to think so readily in terms of millions and billions. But that great year was the swan song of the British Columbia gold fields, never again did they reach that total. Year by year the output dwindled; dwindled, too, the mushroom towns that had grown up on the scene of the supposed Eldorado. Gold was still to be had for the labor, but the bubble of fabulous wealth had been pricked and the hardy adventurers were off to some newer land of promise.

The Gold was still a great industry for those times, but the glamor of it was gone and it had settled down into its rightful perspective. As yet no one had realized that there was a new Eldorado at their very feet in the swarming life of the great rivers, teeming with fish. The British Columbia fisheries that make the hey day of the gold rush seem as nothing, were practically untouched. At the time of Confederation there were one or two whaling enterprises, and a



Canada's Earliest Railway Equipment.

Some new invention and some fresh effort for the betterment of humanity.



Winnipeg from St. Boniface Ferry Landing—a few years after Confederation.

solitary cannery on the Fraser. The coal fields of the province had been discovered and were being worked to some extent, but they were practically only tickling the soil.

British Columbia was shut off from the remainder of the country by league upon league of pathless prairie, a journey of long toilsome perilous weeks. The sundering force of distance kept the west and the east as far apart as the poles in their material and social interests.

Shipbuilding Industry of the Down East Coast

While British Columbia was feeling the impetus of the Gold rush, the older colonies by the Eastern Sea had progressed somewhat more solidly if in a less spectacular way. In Nova Scotia, favored by the yet almost virgin forests a great shipbuilding industry had been built up. Every creek almost had its shipbuilding yard. These vessels were sold on each side of the Atlantic. There had been, too, a spasmodic activity in the Nova Scotia coal fields for half a century. At the time of Confederation they were mining some 600,000 tons of coal about half of which was used locally and half was shipped to the United States. There was also some little smelting done of Nova Scotian Ore, though this industry had hardly developed beyond infancy.

The Maritime Provinces like the far west were also cut off from central Canada by enormous areas of uncleared untracked land. Indeed the association of these Eastern provinces was much closer with the United States than with the other parts of Canada.

"Boston," said one Nova Scotia representative, "is only a few hours' trip, but to come to Toronto you need to mortgage the farm to pay the fare."

In this casual statement lay a great element of danger to the unity of the young country. The drift of things was naturally from Canada to the United States, which was then the land of opportunity.

The Lure of the Republic Draws Canada's Sons

The very name, Republic, drew like a loadstone, those immigrants from the older lands of Europe, eager and heart hungry for some spot on earth where



A view of the four corners of King and Bay Sts., Toronto, 1870—on right is A. Baker's Tailor Shop.

Battleships should never have been built for war, but for the preservation of peace—

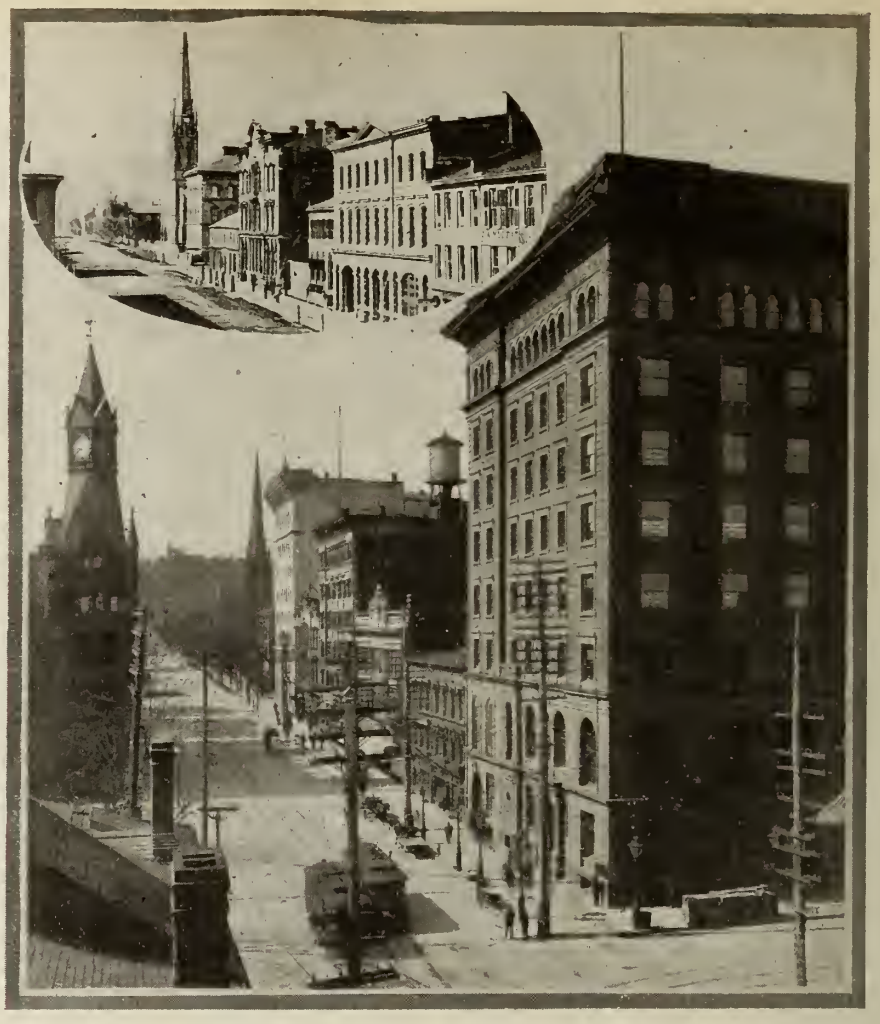
they might find freedom. The very name of Canada's southern neighbor had a drawing force that the colonies of Canada could not have. In those early years therefore there was a marked and dangerous tendency, not only to lose the fair share of immigration from overseas, but to lose as well many of her own young men who thirsted for the opportunity that it seemed to them could only be obtained in the more advanced country to the south. This flux of young Canadians across the border was hardly compensated for by the influx of population that at this time reached very small proportions.

The country was mainly a great wilderness with areas of civilization dotted at irregular intervals, with no means of communication between the different localities. It was not a great country, but several small states each trying to work out their own salvation with very little reference to the general whole. Despite these conditions there lay in these scattered colonies the seed of greatness, but with no immediate promise of any harvest to catch the attention. Not unnaturally therefore the tide of population was turned from their shores to the breezy, boisterous, prospering neighbor to the south.

A Glimpse at Canada's Early Industries

Even Canada's industries were of no great extent. A land that has become one of the premier farming nations of the world, in those days just prior to Confederation had not yet awakened to the immense possibilities of her virgin fields. Ontario tilled more land than all the other provinces together. In New Brunswick only 1/10 of the land was cleared, and it was to be had for 50 cents an acre or in return for certain statute labor. In Nova Scotia land sold for $45 per hundred acres. Only in Ontario had farming become the backbone of the country. In Quebec the lumbering industry was the chief source of revenue and no mean source even in those days bringing in a total of some $14,000,000. Other industries were few and far between. The saw mill, the grist mill and the brewery were the beginning of manufacturing development and around these grew up the whole manufactory of the nation. Around these mills grew up the village that grew in size as the exigencies of conditions demanded till even at the time of Confederation Canada had some sizable towns. The population of Montreal was 100,000, of Quebec city, 60,000; Toronto came next with 50,000 while Hamilton, Halifax and St. John, N.B., each had about 25,000 inhabitants. But it is not in these cities but rather in the more slowly developing rural districts that can be traced the impetus that has sent Canada so far along the road of progress.

A good many of Canada's industries were purely fortuitous in their origin. The great tannery industry grew up because Canada was to a considerable extent a grazing country. Everyone kept a cow or two, even in the cities the cow was an almost indispensable adjunct of the household. The day, being the day, of the cow, it was natural that hides were plentiful. The abundance of hemlock and oak bark was the other condition that assured the growth of this great industry.



Hamilton, James St. S., 1861 *and to-day.*

At that time too there grew up a great woolen industry, fostered by the famine in cotton that followed on the dark days of the civil war. Moreover in this early industry Canada held a high place, and the honest worth of her tweed was widely recognized. These were the days when homespun was still the prevailing style, more than half the farmers still took their wool to the carding mill, then home again for the women to spin it and back to the custom weaving shop to be finished. Such was the beginning of the clothing industry that is such a factor in Canada to-day .

The Growth of the City from the Humble Beginning of the Crossroad Mill

Our great manufacturing industries sprang just as naturally from the corner blacksmith shop. First only a repair shop but gradually emerging from the early stage, doing small manufacturing operations till out of this finally arose the great manufacturing establishments that have meant so much in Canada's development.

It was about fifty years ago that some of Canada's natural resources first began to be discovered. Oil was discovered in Lampton in 1862, and Petrolia in 1876 was tanking 3,000 barrels a day. The only difficulty confronting this new discovery was to make the demand for it equal the supply. About half the amount was used in Canada. Efforts were made to ship it to Liverpool, but the port authorities there refused to give "the evil, smelling product" storage room so there was no incentive to develop this great industry for some years, until in fact manufacturies had developed in Canada, and until the wider knowledge of the many uses of the product led to an almost limitless demand. In 1866 salt was discovered near Goderich, Ontario, and its 90 barrels a day constituted the whole output of Canada's salt industry.

There was very little manufacturing in those days. One sugar factory in Mon-

They were meant for sea police duty—guardians of the sea roads.

treal provided one of the first instances of industries based on foreign supplies. This Company, The Canada Sugar Refining Company, is still doing business in Montreal. The great chemical industry was also in its infancy at the time of Confederation. Drugs, soap, starch and potash were practically the only products in this field. Of Canada's great dairying resources there was hardly a trace at this time. There were in fact only a half a dozen cheese factories. From this small beginning only half a century ago has sprung one of Canada's premier industries.



St. James Street, Montreal, Looking West, 1871, and As It Is To-day

Riveting a Continent With Steel Rails

Canada was just waking into a realization of her possibilities in the year 1867. Possibly it was this spirit of the times that brought about a political Union that was to make Canada a Dominion from sea to sea, that showed also to these men who had dreamed this dream of Union the necessities that lay before them, showed them the disintegrating effect of isolation, and pointed them to the possibilities of a country united by a great highway of steel from the shores of the Atlantic to that other shore half the world away.

At any rate it was the development of Canada's railroad systems the demand for which had been part and parcel of the Confederation issue, that has been the source of almost every forward step that Canada has taken in all the years succeeding. Ontario had been built up around the Grand Trunk Railway and there was now to be another example of what the railroad could do as a developer. Winnipeg was a trading post on the fringe of civilization 20 days journey from its nearest neighbor. In the year 1876 Winnipeg had but 215 inhabitants and others were slow in coming. There was no particular incentive to lead men to venture out into this prairie land. True it had been discovered that this land was a veritable garden for the growth of wheat. But of what use was wheat that was twenty days journey to the nearest selling point? Manitoba wheat, good and all as it was, was worth 50 cents a bushel at Winnipeg. In 1878 the railway line between St. Paul and Winnipeg was completed cutting a twenty days journey to three. At once Manitoba wheat jumped to 75 cents. Here was the incentive that caused the great wave of immigration that has been flowing toward the west from that day to this.

The Intercolonial Railway was finally completed after forty long weary years, and the Provinces down east by the Sea, has some reason to look to their sister provinces as their greatest interest rather than to cast their eyes across the boundary line. In 1886 the C.P.R. was completed and the nation linked from sea to sea. This was the firm basis for a united country.

The Dark Years

But Canada was yet to suffer her dark years. In 1873 the great boom built up on speculative activity in the United States, and in a lesser degree in Canada, burst. Canada who had been boasting herself in some of her growing industries looked into the face of calamity, and shared in the almost world wide panic. Her business was almost at a standstill. Of her grazing industry little remained in that year not a beast was shipped to the Old Country.

Canada Comes Into Her Own

It was not until 1896 however that Canada swept into the full blaze of her prosperity. The Canadian West was the new Eldorado. Reckless farming had exhausted the American wheat lands and new sources of supply were needed. This was Canada's opportunity. Men and money were plentiful and the hey-day for Canada began. The tide of immigration that seemed to have set away from Canadian shores, turned again. This tide of immigration from the United States alone reached in 1897 to 9,000, and by 1917 it had mounted to 133,000 while in the period covered by these two dates there had come to her shores, 221,402, the great bulk of these being of British or American origin. Here is an astonishing indication of the pulling power of opportunity backed by good advertising.

In these past fifty years Canada has stepped out of her swaddling clothes into real nationhood. And standing here in the din of these troubled years Canadians can not only look back on the past half century with pride, but look forward to another half century with a confident hope and expectation. Tried in the tragic fires of war, made strong by struggling years she takes her place among the nations on an even footing. Whatever is before the world in the aftermath of war, this is certain, that Canada has a great place to fill, and it is the confident belief of all Canadians that she is able and worthy to fill it.

CAPITALIZATION INCREASED

The Canada Pipe & Steel Co. have been authorized to increase their capitalization from $300,000 to $600,000. This company is one of the concerns in which the Cluff Brothers, of Toronto, are interested.

Soldiers on land should be instruments of peace, not war.



THE FATHERS OF CONFEDERATION—CANADA WAS 50 YEARS OLD JULY 1.

Hewitt Bernard W. A. Henry E. Palmer Ambrose Shea F. B. T. Carter John A. Macdonald Geo. E. Cartier Thos. H. Haviland Peter Mitchell R. B. Dickie W. H. Pope J. M. Johnston
W. H. Steeves Charles Fisher J. C. Chapais E. B. Chandler Adams G. Archibald E. P. Taché Alex. T. Galt J. Cockburn J. H. Gray A. A. McDonald
Edward Whalen Col. John Hamilton Gray Geo. Coles Alexander Campbell Geo. Brown Oliver Mowat Wm. McDougall J. McCully
Samuel Leonard Tilley Hector Langevin Charles Tupper Thos. D'Arcy McGee

THE SANITARY ENGINEER

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EDWIN NEWSOME - - *Editor*

Circulating amongst Sanitary, Heating and Ventilating Engineers, Gas Fitters, Sanitary Inspectors, City Engineers, Boards of Health, Architects, etc.

JULY 16, 1917

OUR DUTY TO OUR CALLING

THE SANITARY ENGINEER has for a number of years preached the gospel of honest business conduct and will always do so. Not merely business morals as defined by that class of business man who feels that he is in business for mere dollars and cents, but rather a combination of the man who really loves his calling and is out to do the best he can to serve his patrons in the best and most practical manner, charging for such services sufficient to cover all his honest obligations with a little surplus set aside for a rainy day and other ordinary daily emergency.

We do not agree with such minds as think because of the fact that the public are at our mercy, that we should become exploiters of the public, because for two reasons: First, exploiters are nothing short of merciless thieves of some kind or other; and second, because all exploiters sooner or later get their just desserts, and rightly so.

Now, here is what is happening all over Canada, and no doubt all over the world. A new district is opened up, a town springs into being, all the necessary laws and by-laws cannot be put into force as quickly as they should be; buildings are put up in any old competitive way, plumbing is installed, possibly a little better than Noah would have done it, but not in keeping with the best modern practice. That most destructive of all sound business ethics "Competition" is to give new life, along with the fact that "There is no by-law in the place" and there we find cheap material, old-time poor practices that have been condemned years ago, given new life. Just because "the other fellow is doing it" and "we wanted the job" is the excuse of many.

Just recently a number of cases have come to our notice which are painful, to say the least, because of the very fact that those who have done this work and are doing it every day, know better and respect their own city by-laws in every way.

Where must such things end?

Simply by every member of the craft becoming more conscientious and making a rule not to do work for anyone that is not in accordance with the best known practices on the one hand, and on the other hand to begin right now and do all in his power to bring into force a national uniform plumbing by-law and the standardization of soil pipes and fittings.

It is the bounden duty of every member of the craft to do something to improve conditions that make it easier to evade the law than to fulfill it, to do work that because of its being out of date, becomes recklessly competitive, and finally that brings ruin and disrespect in its train.

THE SANITARY ENGINEER condemns no one set of individuals, but rather every one "en-bloc" that has not done something to put his trade and practices of his trade upon a better footing than when he first entered into that trade.

As we said before, such men are parasitic exploiters and are just using the trade and public for selfish, personal gains. Let us away with such conduct, begin right now and fight for a federal health department. We have proved that the Provincial Health Departments, so far as plumbing regulations at least are concerned, are as incompetent of accomplishing anything as a new born babe.

If such was not the case we would not at this date have work being installed in the way it is being done almost at the very door of the head offices of our Provincial Health Departments all over the Dominion.

This war is doing more than all to quicken the spirit of brotherhood.

The Value of Technical Education

What is Being Done Along Educational Lines in Toronto and Other Parts of Canada For the Budding Sanitary and Heating Engineer—These Boys and Men Will Become a Valuable Asset to the Country—The Apprenticeship Question Will be in Part Solved by the Work of the Technical Schools.

WHEN the doors of the big new Central Technical School opened its doors in 1915 to the younger generation of Toronto. A new era in technical education was heralded in. Not that there had not been a great deal of work done long before that time for the coming industrial craftsman. But with the new equipment, the thousand and one modern conveniences and up to date appliances, a new order of things came into being. For instance if a student were not given the very best tools and machines to operate, then practical efficiency would suffer and more or less out of date methods would become enstilled into the minds of those who became attendants.

Then again such splendid equipment has a great influence upon the teachers themselves because of the fact that they know they are teaching the very best methods that can possibly be taught and the lessons are learned as well as put into practice.

The sanitary and heating engineering has not been overlooked either, and employers have done their best to encourage the good work by supplying boys from their shops during working hours. Some too, paid no little amount of time to this splendid movement.



First term students for plumbing and heating course

In the first place no student can register and take in the plumbing and heating courses, unless he is engaged in some shop during the day. This kept the work in the hands of those boys and men who have chosen the plumbing and heating trade as the calling they purposed to follow.

Next the employers sought out a good man and they were able to procure the services of Jno. E. Fullerton as practical instructor, Mr. Fullerton has done splendid work. He encourages the boys in many ways to look upon their work as a calling second to none. He is instilling a sort of pride into the boys and anyone entering the rooms during "working hours" whether in the day time or evening will see that the whole atmosphere of the "shop" is severely earnest.

When the first classes opened for the 1915-16 terms 28 students registered for evening classes and the average attendance was 24, ending with 18 successful students. Their work was a great surprise to many, in fact many departments of the work could not have been accomplished more thoroughly by the "Hoary headed" in the trade, which reflected great credit upon their instructor.

There were also 16 students attending the day classes, which were held on the Mondays and Wednesdays of each week from 1 p.m. to 5 p.m. These boys were all apprentices working at the trade in some shop or other and the employers allowed each boy these two half days off with wages, so that these classes were really a success as far a they want.

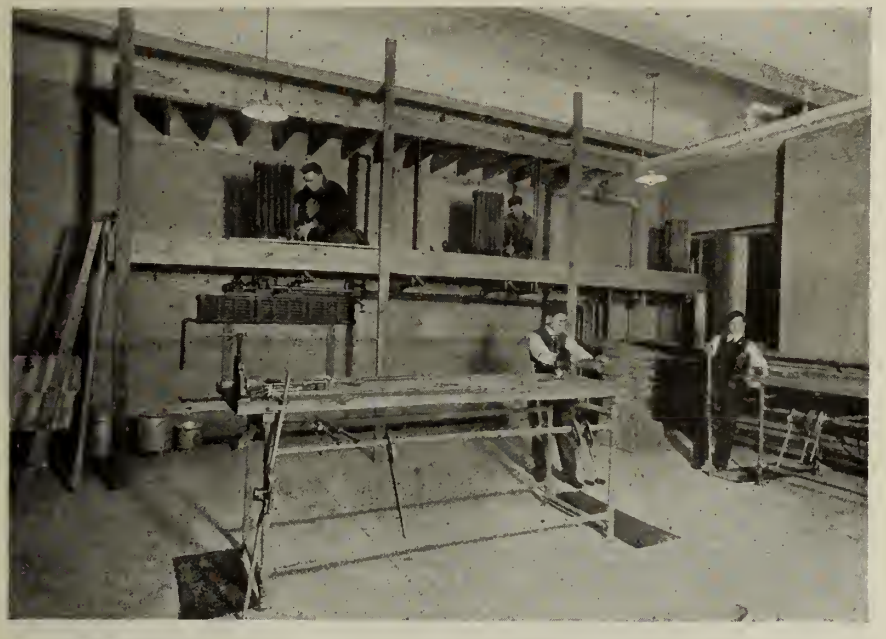


Plumbing Instruction Department

The reason such a small number were in attendance was because of the shortage of help. There is however every indication of a great improvement taking place when the war is over.

The accompanying views show the two classes busy at work. Fig. 1 being the plumbing class, Fig 2 the heating class, and Fig. 3 the 18 students who were photographed on the closing night of the first evening term.

To see some of the work done by these young fellows certainly made one feel really proud of them. The neatness of the heating installation reflected great credit too. Threads were cut nice and true, screwed well home and in true alignment. No crooked threads and peculiar unnatural offsets. In fact, the whole installation was splendid. The whole atmosphere of the "shop" is pleasing, and bids fair to prove a splendid asset to the plumbing and heating industry in Canada.



Heating Instruction Department

The second term saw quite an increase in attendance at opening and to date shows an average attendance at the evening classes of 33 students.

On account of the shortage of labor, it was found that apprentices could not be spared to attend the afternoon classes, so these were discontinued for the present—very likely until the war is over, when they will be again started.

There is no doubt that the public are beginning at last to realize the value of practical education, the technical schools all over the Dominion are doing splendid work. Students who attend are becoming of more value every day to the country, they become a greater industrial asset and when executing a piece of work, are taking more real pride in it because of the fact that they know what they are doing and what their work means to some other individual.

One of the greatest curses in the industrial world is the lack of conscious responsibility towards those for whom the work is being done. Take, for example, the sanitary equipment of a home, where price has ruled instead of honest value in quality and workmanship.

No technical school student will care to do slipshod work, because of the fact that in learning how to do a piece of work he is also shown what is involved in the work. Look at the poor miserable wiped joints, or the "yarn packed" screwed threads that are "put over" on the suffering public. The technical school will abolish all that type of work, and will bring about an era when quality will count, not mere dollars and cents alone.

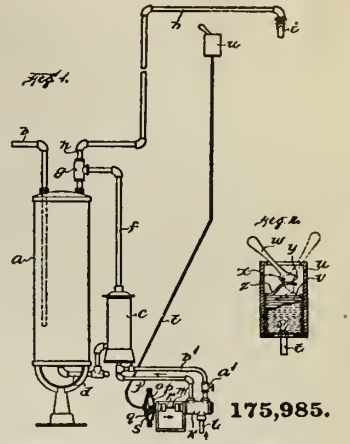
NEW CANADIAN PATENTS

(Continued from page 21)

actuator for causing the actuator to be moved in response to impulses from the other controller.

4. The combination with a heat furnishing means, of a valve for controlling the supply of heat to said furnishing means, a pressure-operated actuator adjacent to said valve and arranged in such engagement therewith as to control the opening and closing of the valve, hot water taps for delivering water heated by said heat furnishing means, a conduit containing fluid adapted to transmit pressure leading from said actuator to points adjacent to each of said taps, and means in connection with said conduit and located each in proximity to one of the taps for applying pressure to the fluid in said conduit.

5. The combination of a valve, a pressure operated actuator for controlling said valve, a fluid conduit leading from said actuator, and a closed collapsible container in communication with said conduit and containing fluid, and means for applying pressure tending to collapse said container, whereby to place the fluid therein under pressure.



175,985.

Water Heater Mechanism.

6. In combination with a valve, of a fluid operated actuator arranged and engaged with said valve to control the opening and closing thereof, a conduit leading from said actuator and containing a relatively incompressible fluid, a collapsible container filled with such fluid and in communication with the conduit, and a lever having a cam portion bearing on said container and arranged to apply collapsing pressure thereto when moved in a predetermined manner.

CONDENSATION VALUABLE—WHY?

(Continued from page 32.)

shortage of supplies should mean redoubled efforts to attain economy in the use of our fuel.

To-day, as at no other period of our history, is the time for a real effort to be made in conservation of our fuel. Conservation and efficiency in fuel consumption is to-day not only a desirable thing, at is a national patriotic duty, demanded from every one of us.

In fulfilling this duty, engineers and steam plant owners will find that "Virtue is its own reward," and they will find that instead of the steam plant being a "dead loss" tax on their business, it will become dividend earning. Even the small sum of five cents daily means a loss of interest at 6 per cent. per annum on a capital investment of $250. What amount of interest does your total preventable losses in the steam plant represent?

If this article is instrumental in arousing a "Fuel-Saving" interest in the minds of its readers, and tends to produce fuel economy in steam plants, the writer will feel that his efforts have been amply rewarded and his purpose achieved.

The end of this war will see a prostrated spirit of militarism— And a more lasting peace.

Equipping Farm Homes with Bathrooms

Port Perry Merchants Are Working Comparatively New Field With Gratifying Success—One Sale Brings Another—In Old as Well as New Homes—Added Turnover of Over $3,000 in a Year — Suggestions For Pushing Sales.

WHEN one enters the store of Parrish Bros., at Port Perry, Ont., on the edge of Lake Scugog, probably the most prominent thing that first attracts the eye is a group of glistening white bathroom fixtures.

In a town the size of Port Perry, with only 1,200 population, the merchant naturally has to depend to a great extent on his country trade, and it is for the purpose of drawing attention to a line that has been proving a good seller in the country districts around Port Perry, that this article is written. On this single line, Parrish Bros. increased their total turnover by between $3,000 and $4,000 last year.

In Line With Other Comforts

The public has been stirred by the present scarcity in a great number of articles of food due to a lack of labor on the farm. This has started anew the agitation for an improvement in conditions upon the farm in order to keep the hired help and sons of the farmer there instead of having them drift into the cities. Various suggestions have been made along this line. These, of course, include radial railways, electric lights, use of autos, extension of the telephone system, and also of rural mail delivery. Not as much attention has been paid to improvements of the inside conveniences of the farm house and the farmer is in a mood now to listen to an argument of this kind. It is up to the hardware merchants to advance this argument. It is being done by this firm in Port Perry and another one, W. V. Carnegie, to good effect. The installation of the bathroom in a country home will surely stand up with any of the other improvements as one of the strongest elements in keeping farmers' sons in farm life.

Interesting the Wives

What a chance here to interest the house wife, just as the seller of automobiles does the wives of his prospects and their children as well! Have a few circulars to send out to 50 or 100 farmers in the neighborhood, one addressed to the husband, the next addressed to the wife, perhaps. Show them some attractive views of the various pieces, and a bathroom already fitted up, and play up the idea of an "added comfort" in their home, making it in this respect fully equal to a city home in comfort, and see how soon you will have stirred up a desire for purchase, in at least the heart of the feminine member of the household—once that has been secured, the head is likely to capitulate sooner or later. If the possibilities in this line are carefully followed, the sales should be very large.

Reprinted from Hardware and Metal.

Old Homes as Well as New

Most of the work was done by Parrish Bros., as might be expected, in new homes that were being built by the farmer. The building of a new home always opens up a very favorable prospect. A fair proportion, however, of the orders received came from the older houses in the country, and this, too, offered a very promising field for the hardware merchant who is able to carry this department in his store.

Customers Brought New Business

Another favorable feature of this line of business was that several of the orders came from neighbors or other friends of those whose houses had been fitted up and who had been persuaded by the satisfaction the others felt to follow their example. This brings out strongly the old saying about the satisfied customer being the strongest advertisement a firm can have.

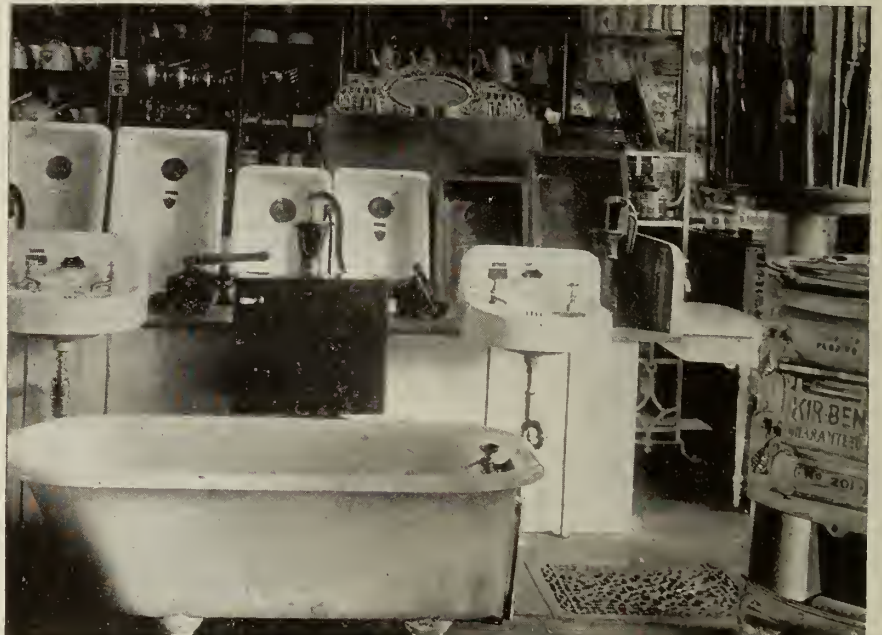
From $250 to $300

The prices charged for the shipment run from $250 to $300. Usually the smaller sum rather than the larger. This includes the three pieces themselves and also the water tank at the top of the house for storing up water, and the hot water boiler in the kitchen. It also includes connections between the tank and the cistern, and on this point the country home has a distinctive advantage over the city in being able to have the system installed and operated with "soft" water. The tank that is used for supply is about 6 feet long and about 18 inches wide and high.

The Septic Tank

So far as the installation of the septic tank is concerned, the excavation is usually done for this and for the drain by the farmer himself. The work, of course, can be undertaken, if desired, by the merchant. This will be added to the estimate of cost already given. Very frequently the farmer undertakes also the building of the septic tank with cement that is furnished by the merchant.

The payment for the contract is done wherever possible in cash, but occasionally merchants accept a fair proportion of the total and take the farmer's note for the balance.



Bathroom supplies featured near entrance to store of Parrish Bros., Pt. Perry, Ont. The accompanying article tells how Parish Bros. are developing trade in the rural districts.

Send Around Photographs

A good suggestion as one means for working up a buying spirit in the breast of the farmer and his family is that a merchant who has installed one of these systems arrange to have a photograph taken of the bathroom itself and use this in the store either in the window or besides the goods themselves in the store, and also get some prints to send

(Continued on page 39.)

Steam Condensation Valuable--Why?

What it is and Why We Need it—Correct Methods of Handling and Utilizing Steam Condensation — Showing That to Allow Natural Law Full Sway, the Problems Confronted May Easily be Remedied.

By Wm. H. Rose, of R. E. Cleaton & Co., Engineers, Montreal and Toronto.

The remaining 20 per cent. of the boiler power being used at low pressure, one or two pounds per square inch, the resulting condensate was lower in temperature. The thermometer, however, showed that the temperature here, as feeding into the boilers, was 200 F., average.

The total heat in the water at this temperature is 168 B.T.U. The heat exchange therefore is 1,019 B.T.U. per pound of steam evaporated. This shows a saving per pound of steam of 25 B.T.U., or 2½ per cent. of the heat required formerly.

These savings in heat, or fuel, were entirely due to the proper handling of the condensate.

There is another factor, however, that must not be lost sight of, as it is important in its effects on fuel economies in a boiler-room of this description, this refers to the boiler feed pump.

An ordinary steam-driven duplex boiler feed pump will use anywhere about 120 pounds of steam per H.P. per hour in operation. It is entirely unsuitable for handling water of condensation at high temperatures, which are found in plants of this description.

The steam which it consumes must be generated in the boilers at the expense of the fuel pile. The steam which passes through the pump cylinders is generally wasted. It exerts no useful effect on the water passing through the pump. We have seen that it is unnecessary in handling condensation, as natural laws, properly applied, will do the same work.

The pump may be generally said to absorb from 3 to 5 per cent. of the boiler power. This of course means 3 to 5 per cent. of fuel burned needlessly.

The automatic boiler feeders operate on about 10 to 12 pounds of steam per H.P. hour. The steam which goes to operate them comes into direct contact with the water which they handle. The consequent result is that the heat of the steam used is absorbed by the water, and goes back to the boilers in the water.

The boiler feed pump in this plant used up about 45 pounds of coal per hour, or 450 pounds per day. This also was saved.

Further, as every steam and return line was now sealed up and operating as a closed system, all the open pipes which formerly vented to the atmosphere were cut out. This loss also was saved, and it proved to be quite a respectable amount as the final results showed.

As before stated, the proper instruments were not available to determine, in exact terms, just what the fuel economies were in each section of the plant, but subsequent operation and tests showed beyond a shadow of a doubt, that there was a total economy of at least 25 per cent. of the fuel formerly burned under the boilers.

The moral of the foregoing statements is, "Handle Your Condensation Properly."

If you are now burning 100 pounds of coal and can save 25 pounds of that amount, does it not show that you are wasting, at least, 33 per cent. of the fuel which is necessary to make the steam.

Here is another illustration which the writer will give of a right and a wrong way of handling condensation from steam units. This refers to a brew house plant. These examples could be continued indefinitely.

This plant offered a fine opportunity to show what could be done to effect economies, because there was no bunker space. The coal was delivered daily and weighed as it came into the boiler-room.

The economies, resulting from the proper handling of condensation here, were apparent the first time the boilers ran under the changed conditions.

What the water economies were, we did not measure up. Only the coal was weighed, and this showed a saving which amounted to 3 tons per day, amounting to $10.50.

This coal saving paid for the entire cost of changing the condensation system in two months, or 52 working days.

Let me describe this plant, as it was operating, and the changes which were made. These were of a very simple nature, and can easily be adopted in any similar plant.

There were two large brew kettles, one with a capacity of 210 barrels. The other had a capacity of 110 barrels. They were boiled by means of live steam taken straight from the boilers through a 3-inch pipe.

At each of the kettles there was inserted in the branch lines a pressure producing valve. The pressure being here reduced to 35 pounds per square inch.

Here, let me give you the reason for using these pressure reducing valves. When their engineer took hold of the plant, he was constantly worried by telephone calls from the boiling room demanding more steam. Although his firemen were shoveling coal at their hardest, the kettles were not boiling fast enough.

The engineer had to run around the steam traps on the return lines and open up the by-pass valves and blow the condensate into the sewers in order to relieve the condensation from the kettles.

Evidently these steam traps had not the capacity to handle this water of condensation in the volumes in which it came from the kettles.

This man then thought that if he could reduce the pressure on the kettles he would reduce the volume of condensation flowing from them. So he could. But he forgot that without condensation there could be no heat, and that the greater the flow of condensation from the kettles the higher was the efficiency of the kettles, and the more heat was transmitted to the liquid in the kettles.

Therefore, to reduce condensation, he put these valves in and set them at 35 pounds pressure which he "guessed would be about right."

Then he thought perhaps his traps were not big enough, so he bought two larger float traps, fitting them into the return lines. To utilize the water of condensation he discharged these traps into a water tank over the boilers, thus providing make-up water for his feed pumps.

This helped somewhat, but it was still necessary, at certain stages of the operation of boiling, to open up the by-pass valves and blow the steam clear through to the water tank to assist the kettles.

This lay out was the best they could do. These people also thought they were handling their condensate in a proper and economical manner. When the writer visited this plant, however and looked over the condensation system, he made certain remarks, principally to the effect that "this was not an economical system," and that the "process of boiling was costing more money than it should." He recommended that the condensate should be put back direct to the boilers, cutting out the traps, tank and pump.

Both the engineer and the brew-master demurred to this statement, pointing out that the steam had already done its work in the kettles and that the condensation was usefully employed in heating up the feed water for the boilers.

They could not be convinced that the efficiency of the kettles was very much reduced owing to the action of the steam traps holding the steam in check, and interrupting the free circulation of steam through the kettles.

Nor could they be convinced that, as they had the condensation at a high temperature, it was a dead loss to cool it down before entering the boilers.

Neither could they see how they were still further wasting heat by running the condensate into the water-tank, and raising up the temperature of a larger body of water than they could usefully employ in the boilers. This being a large iron tank with a very big superficial area, the whole surface of it was acting as a radiator to cool the water and heat up the surrounding air.

However, after considerable endeavor on the writer's part, they ultimately agreed to the following arrangement:

The writer was to take one of the kettles and make such changes in the condensation return pipes as he thought would put the kettles in economical shape. Make a test on the kettle without making any radical changes, or putting the kettle out of commission while doing so.

If the results were such as he predicted, as to the economies effected, they would then equip the entire condensation system of the whole plant.

The following covers the changes made. The larger kettle was the one decided on. The only changes that were made were to break into the return line, between the kettle and the float trap, providing a pair of valves, one to control the trap, the other to control the new return line.

The new return line from the kettle was taken direct back to the boilers, and there connected to the feed lines from the pump, making the connection just ahead of the pump check valve.

Obviously, as this condensation was at a lower pressure than the boiler pressure, it would not enter the boiler, so we inserted a connection in this line at 4 feet above the water line. There we fitted an automatic boiler feeder into which the condensation would enter.

This feeder, as explained before, operated entirely by gravity, and the weight of the water. It was provided merely as a means of equalizing the two pressures in the tank and in the boilers.

The work to be done in the kettles was to receive the "Wort" at a temperature of 180 F., bring this to the boiling point, 212 F., and then evaporate into steam a quantity approximating 10 to 12 per cent. of the entire contents.

The test was to be as follows: The larger kettle was to operate alternatively on the old return system and on the new. The two valves in the return line were to enable them to do this.

The both kettles were to operate at the same time, to enable them to run a comparative test, based on barrels brewed and time occupied, in the two kettles. The test also would show just how many pounds of steam were condensed in the operation.

It may be observed here that a direct boiler feeder makes an ideal feed water meter. This is accomplished by means of a counter attached to the tilting mechanism, the counter and the cubic contents of the tank being calibrated. The counter records the number of times the tank falls over. The number being multiplied by the number of pounds the tank holds, the result is pounds of water fed into boilers.

The tests showed the following result: The both kettles were started at the same time, the condensation going back to the feed water tank. Both kettles boiled on the 35-pounds pressure, and while both kettles were boiling, the firemen could not keep up the working pressures of the boilers, shoveling coal continuously.

With one kettle (the large one), discharging its condensate direct to the boilers through the automatic feeder, there was no difficulty whatever in keeping up the steam. The operation of boiling was completed in 30 minutes less time in this kettle than in the smaller one.

The pressure never was greater than 15 pounds on the kettle gauge, although the pressure reducing valve was not disturbed, thus proving that the circulation was improved, condensation freely escaping, no back pressure piling up, and that the kettle was condensing the steam in greater volume than formerly.

The smaller kettle showed pressure of 35 pounds on the kettle gauge, and as stated took 30 minutes more time to complete the boiling process.

The counter on the boiler feeder showed that approximately 10,000 pounds of steam was condensed, while the thermometer in the feed line showed a temperature in the condensation as it entered the boilers of 300 deg. F.

With the smaller kettle, on the same basis of calculation, the total boiler H.P. required per hour for the two kettles was about 250 H.P.

The net result of a week's test on the large kettle showed good economy and efficiency, that the writer was instructed to alter the small one along the same lines, and the results in economy of fuel consumption obtained through the changes in the method of handling the condensate were such that two wagon loads of coal out of five were saved, equal to three tons of coal daily. Why was this?

Just as in the case of the candy factory before referred to, it was due entirely to the saving of the heat in the condensate, the saving of the steam used in the pumps, and the shortening of the time required for boiling, owing to rapid circulation being established.

Here we see again, that there is a right way and a wrong way to handle condensation in steam plants, and from the writer's personal experience in dealing with condensation problems, at least 75 per cent. of the steam plants in the country are operating under conditions similar to those described, and would respond to the same economical results, to skilful handling.

It has been repeated over and over again in these pages that the right way to deal with condensation is to drain it away quickly, at its highest heat, and feed it into the boilers.

This cannot be too strongly emphasised. The heat in the condensation represents fuel which has already been burned to heat the water, and make the steam.

If this is kept in the water, and the condensate is not cooled off, there is so much less heat to be applied to each pound of water to convert it into steam again. How often do we see this done? Very rarely, indeed, although steam engineers, heating engineers, and steam plant owners, are becoming daily more alive to the necessity of saving every heat unit taken from the fuel in the shape of steam.

The question is being forced home to these people for their more careful consideration, more strongly in the present days, owing to the never ceasing tendency towards higher fuel prices.

Notwithstanding this, there is still a greater necessity for economy in the use of fuel to-day, and if this question receives the consideration it deserves from all concerned, we would not hear so much outcry against high coal prices.

As the engineer and the steam user have to get heat and power, why should they not strive to get it as cheaply as possible, when in doing so they can improve conditions all round, not only for themselves but for every other user of coal?

It stands to reason that if these "preventable" losses occur in so called modern plants, much greater losses occur in those plants which cannot be called modern, and when we multiply the total daily fuel losses by the number of plants operating, we can readily see there must be an appalling gross waste of our fuel reserves.

The total coal available at any one particular time is limited, and it is our duty, every one of us, to make a united effort to make this quantity go further than it ever did before.

As supply and demand governs the cost of everything, we can see how this effort would react on the price of the coal we must burn to make steam. High prices and

(Continued on page 29)

Sanitary Fixtures—Then and Now

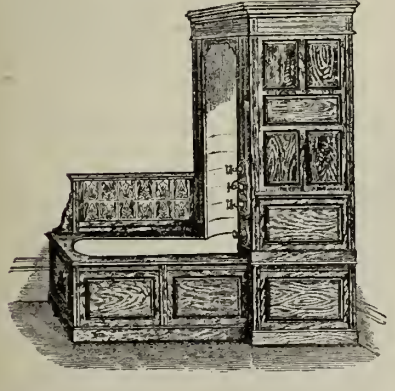
A Look Into the Past With a Glimpse Into the Future—Showing Views of Some of the Fixtures of Days Gone By and Now—No Other Line of "Domestic Service" Equipment has Made Such Progress.

YES, Mr. Plumber (worker in lead), I shall require all the lead pipes and traps encased with mahogany safe wastes and vents.

The lavatory must comprise a nice thick marble slab and blue and gold interior bowl. The bath, too, will require to be encased with carved panels round it. The pipes for the shower bath must all be of copper and have good ground cocks on each branch.

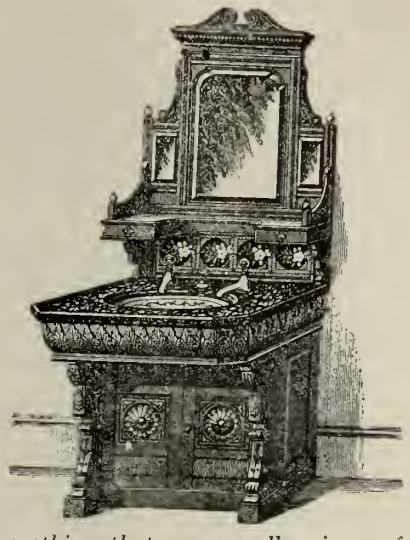
The water closet must be fitted with a good-sized cast iron flush box and fitted as high as possible. Bowl to be embossed with square base, etc., etc.; and no doubt





Two real "classy" bath and shower combinations of a few years ago

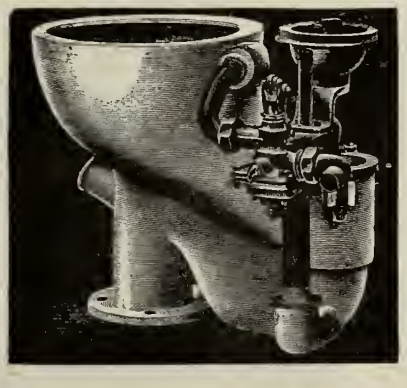
in those days these fixtures, a few views of which are shown in this article, were really a work of art, the lead joints and waste pipes all neatly made and placed. If a fairly long length of lead waste pipe was installed, it would be laid on a board and pieces of scantling nailed to the side as support for the lead pipe. The old overcast joint has gone for ever, as also has the light soil pipe, sharp tees and bends, too. The black iron kitchen sink still turns up once in a while, as also does the old washdown bowl. Very few high tanks are sold now except in very rare cases.

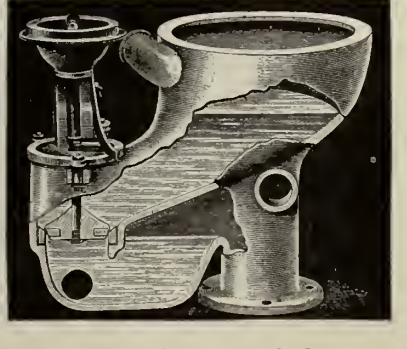


Something that was really nice a few years ago.

The long brass waste and water pipe is without doubt a thing of the past. In those days nothing would do but to have a good big tank well up to the ceiling, and if the ball cock had to be taken out for repairs, it meant that the tank had to come down.

A cast iron embossed lavatory with scalloped apron and fluted post was a work of art in those days; quite a contrast to the cast iron enamelware or





Front and rear view of an old Inner W. C.

vitreous china pedestal lavatory of to-day.

The old style w.c. outfits, such as the Dèmarest and the Jenning—two views of the latter being shown in this article—will no doubt recall to many of the old guard the memories of long ago. Then turn to the illustrations of the Sitz baths of then and now. What a contrast, though by no means so striking in the case of the shower bath or the lavatory.

Think of the ordinary bathroom of bygone days, when the whole three fixtures were boxed in with V-jointed black wal-

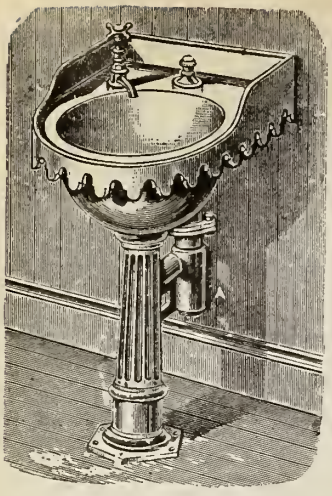


A modern combination of bath and shower, quite a contrast to the ones in use in days gone by

nut, the long narrow bathroom, about 6 feet by 10 feet long, marble slabbed lavatory behind the door; next the copper-lined bath ,and last the water closet. If the job was a little high-grade, a Demarest type of closet would be installed, with a beautifully French polished cover over it and china stirrup-shaped pull with which to flush the closet.

What a contrast between the picture drawn in one's mind and the illustration of a modern, though by no means expensive bathroom of to-day.

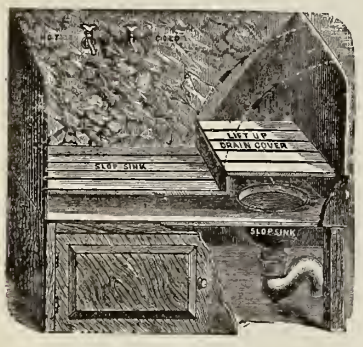
When we see illustrations of the fixtures of bygone days and of the present day, one cannot help but fell a little thrill of pride at the progress made. Just im-



A work of art in the olden days

agine, again, the crude appliances for heating water in those days. A person wishing to procure hot water for a bath would have to take a match, fill up the copper boiler and wait till it got hot. In many cases the maid or the butler had to attend to this piece of equipment and know beforehand the time a member of the household would require a bath.

In many cases a gas burner was fitted



An old-time kitchen sink.

under the bath itself and water heated in that way; and in the Motherland we are told some of the fixtures such as are shown here are still doing service. The cast iron flush tank, the bath in the wash house with a wooden cover over it, the

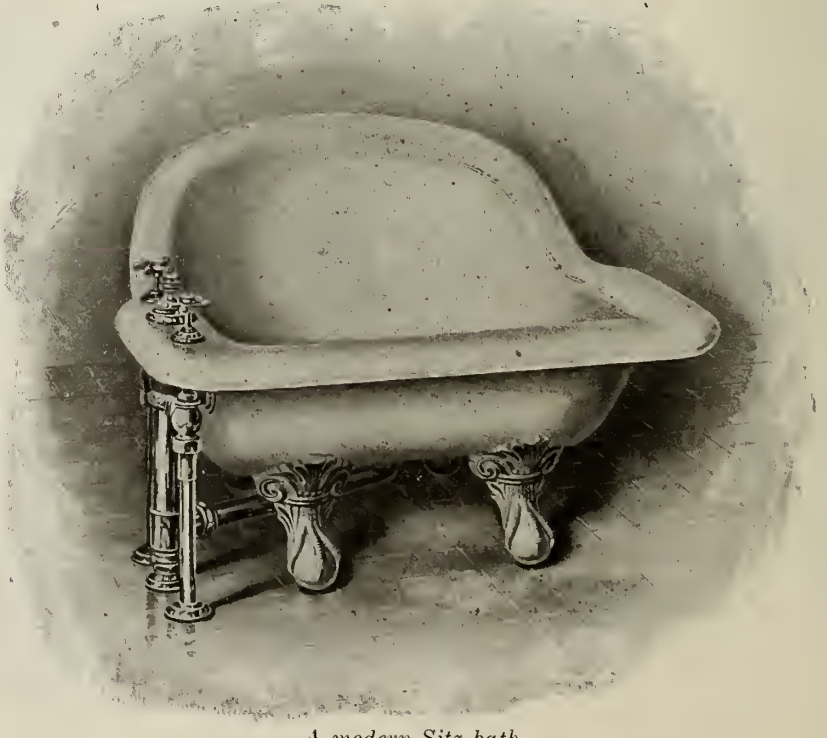


A Sitz bath of comparatively a few years ago



A modern pedestal lavatory quite a contrast to those of olden days

latter used as a table when the bath is not in use, all of which, of course, were the best that space would allow of being installed, which brings us to another phase of the sanitary and heating question, viz., the installation of waste pipes,



A modern Sitz bath



A w.c. combination of olden days.

soil pipes, vents, etc., and adequate room in which to put the piping in.

Every reader of THE SANITARY ENGINEER will agree with us that about the last compartment to be given any attention is that of the space reserved for the bathroom and lavatory accommodation, even the planning of the kitchen and pantry should receive more attention than is given by at least 90 per cent. of our architects, particularly those who erect factory and office buildings and cheap residences.

The writer has many times courted the wrath of such architects by taking them to task for not consulting men who know what is needed and the proper layout of sanitary appliances, in factory buildings in particular.

Almost the first space in such buildings to be allotted should be that to be used for toilet fixtures, locations that would save steps for the employees.

About three years ago an office building was planned by an expert architect in one of our largest Canadian cities; the building cost in those days nearly $80,000, and is occupied by —— persons. It is estimated that at least 5 per cent. of the salaries could be saved by most office employees for their employers if more attention were paid to such details.

The value of such conveniences in office and factory buildings has never been efficiently demonstrated, not even by the average sanitary engineer.

The planning of a kitchen, too, is very important to the householder, and when the sink and drain boards are installed, attention should be paid to the question of location, taking into consideration the probable steps that can be saved, the location of the doors and windows, etc. The laundry trays, too, need not always be placed in the basement. Just by way of illustration, we might mention a case where a wealthy gentleman asked the writer to go to his new residence and look over the sanitary fixtures. There was plenty of floor space and lots of room for a laundry on the ground floor. Money was no object in this case, yet the laundry was located in the basement. Plenty of light, etc., but low ceilings; in winter poor drying provision, and what was most objectionable of all was the odor of soap suds that penetrated through the whole house on washing day. The steam and dampness, too, was very much in evidence.

No mention has been made to the owner of such matters, and when the writer showed how a laundry could have been constructed on the ground floor, this gentleman felt very much annoyed.

The time is ripe right now for some real action to be taken by the craft to have conditions altered, and to demand that they be consulted and paid a fee for their advice on such matters. The sonner this step is taken just so soon will the public begin to realize the value of such services. The house referred to here cost over $20,000, and is nothing better than a big jumble of fixtures.

In conclusion, the writer maintains that to have homes, offices and factory buildings brought up to and in keeping with the modern fixtures and fittings that have been put into our hands, those buildings should be better laid out so as to give maximum service and procure greater convenience for the users of such modern sanitary fixtures.



A contrast to the w. c. of olden days.

New Sanitary and Heating Goods

A SILENT W.C. TANK FILLER

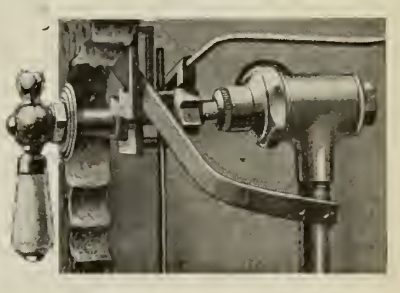
If all claims for the new C. and P. lock and release valve prove in practice to be correct, sanitary engineers are to at last get rid of noisy mechanism, which is the rule rather than the exception with every ball cock on the market.

The following short explanation about noise in w.c. tanks will no doubt prove interesting:

What is the Cause of the Noise?

In the regular water closet tanks the supply of water is controlled by what is technically known as a ball cock, which opens automatically when the water in the tank discharges into bowl. As the tank begins to fill with water the float ball, which is attached to the ball cock by means of a rod, rises slowly, shutting off the water supply while the tank is still filling. When the water is shut off, the ball cock acts in the same manner as if one was holding their finger at the spout of a sink faucet and trying to hold the water pressure. Where there is high pressure it is impossible for a ball cock to hold tight if the opening or waterway in ball cock is full half inch or even three-eighth inch; for this reason it is necessary to greatly reduce the waterway in order that the ball float can be made to hold the pressure. The reducing of the waterway acts in the same manner as a nozzle, reducing the size of stream, but very materially increasing the velocity of flow, just the same as a nozzle on a hose will reduce the size of stream, but create a velocity which will discharge the water from 50 to 75 feet beyond nozzle.

The increased velocity of the flow of water materially increases the friction in ball cock, and this is responsible for the noise, which becomes a regular whistle when about to close off on account of the opening in waterway gradually becoming smaller as the valve closes.



The new C. and P. lock and release valve

The manufacturers of the C. and P. lock and release valve explain in the following words some of the reasons why their valve does not make a noise, and such reading matter cannot fail to be of an educational nature.

First of all, the readers are asked to remember that the valve is not a ball cock. The waterway is not decreased, but is actually increased to half inch size, thus allowing a full flow of water until it closes. There is no slow closing period, as it closes instantly, eliminating the hissing or whistling sounds.

(Continued on page 39.)

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

IMPORTANT changes have been made in lines affecting the plumbing trade since last issue. An increase of approximately five per cent. has been made in various lines of brass valves. Malleable fittings and cast iron fittings have registered advances. Cast elbows, tees, plugs, bushings, flange unions and dart unions are all being quoted at higher prices. Wrought iron pipe has again been advanced. There is an acute situation on this commodity, due to the difficulty experienced by manufacturers in getting supplies of raw materials. On some sizes orders are taken only on the basis of the market at the time of shipment. Nipples and couplings have also been increased in price in conformity with the change in pipe through the changing of the discounts. Range boilers are in continued firm market, due to the shortage of materials for their manufacture. Makers are unable to get additional orders placed in the United States and have accordingly been drawing on available stocks in Eastern Canada to relieve the situation in Ontario. Business is reported good by some plumbing supply houses, while others again assert that conditions are somewhat quiet. Manufacturers of valves still continue to gather in a good business, having more than they can turn out within the specified time. There are those in the trade who do not anticipate that building conditions will show any marked improvement until the war is over and prices of building materials settle down to a lower basis. The opinion is expressed by some in the trade that erection of many buildings is being deferred until more favorable conditions come about.

TORONTO, July 14.—Dealers closely identified with the plumbing trade express the opinion that the apex of building operations has been reached until more auspicious circumstances come about. At the present time there is apparently no further expansion so far as the building of munition plants and extensions are concerned. While the cities are getting along with the minimum amount of building of dwellings there is a fairly good amount of construction work in small towns and villages. From this time forward it is thought extensions may not be made to munition plants, but that any development in building that comes will be along the line of permanent industries such as shipbuilding. While some concerns state business is now in the quiet stage others again express mild surprise at the way the volume of business is keeping up.

Wrought Iron Pipe Has Again Moved Up

IRON PIPE.—Further advances have been recorded on wrought iron pipe amounting to two points on some sizes and four points on other sizes, an increase of from $4 to $8 per ton. Some sizes of pipe continue to be short. Manufacturers are experiencing difficulty in getting raw materials. Wrought nipples and standard couplings have also been advanced in price through the changing of the discounts. Wrought nipples, 4 inches and under, are now quoted at 15 per cent. off list; 4½ inches and larger, at 40 per cent., and 4-inch and under running thread, 25 per cent. Standard couplings, 4-inch and under, are quoted at 35 per cent. off list, and 4½ inches and larger at 15 per cent. New net prices on wrought pipe are shown in table.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917

	Black	Galvanized
	Per 100 feet	
Standard Buttweld		
⅛ in.	$ 5 00	$6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES

4" and under, 45%

4" and under, running thread, 25%.

4½" and larger, 40%.

STANDARD COUPLINGS

4" and under, 35%.

4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces

Enamelware Demand Is In Quiet Stage

ENAMELWARE.—While business in cast iron enamelware is not brisk, still it is not in the doldrums and dealers are not feeling pessimistic over the situation. They are going after any available business that may show above the horizon and encouraging it wherever it is in their power so to do. Any business that is now coming to manufacturers and dealers is stated to be divided fairly equal between the larger cities and smaller towns and villages. Prices have held steady during the time since last issue, at which time an advance of approximately 15 per cent. was recorded. Available supplies of pig iron for the manufacture of these goods are very meagre as Canadian manufacturers are out of the market entirely and the American market is in very firm position with steadily advancing quotations.

Bath-tubs, Roll Rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bathtubs, 5½ ft.	35 70
Sinks, Roll Rim, 18 x 30 in., staple	16 80
Closets, oak tank and seat	22.00
Do., enamel iron or white vitro tank	23.75

Cast Iron Fittings And Nipples Increase

SOIL PIPE, FITTINGS.—As indicated in these columns in last issue, there was a strong probability of cast iron fittings, such increase has been made effective and are now quoted at a discount of 25 per cent. off list. Malleable fittings in Class A are quoted at 50c per pound net on black and 62c per pound net on galvanized. Class B malleable fittings are quoted at 22c per pound net for black and 31c to 33c per pound for galvanized. Class C is quoted at 15c per pound for black and 22c per pound for galvanized. Cast elbows and tees have been advanced, the discount now being 25 per cent. off list. Plugs are quoted at various discounts, in some instances 25 per cent. off list, in others at 30 per cent., while a third concern quoted at 30 and 5 per cent. off list. Bushings are being quoted at a range from 25 per cent. to 40 per cent. off list. Flange unions are quoted in some instances at 40 per cent., and at others at 25 per cent. and 20 and 10 per cent. Dart unions have been advanced, the discounts quoted being 25 per cent.

to 24 2/3 per cent. off list. Nipples up to 4-inch are now 45 per cent. off list and 4½-inch and larger at 40 per cent., with running thread 4-inch and under at 25 per cent. off list.

SOIL PIPE FITTINGS.		
Medium and extra heavy soil pipe, 6-inch and under	40%	45%
8-inch soil pipe	....	35%
Medium and extra heavy fittings, and under	....	50%
C. I. PIPE FITTINGS.		
Cast iron fittings	20, 5%	25%
Cast elbows, tees, etc.	20, 5%	25%
Plugs	25%	32%
Bushings	25%	40%
Flange unions, standard	20, 10%	25%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Dart unions, ¼-inch to 2-inch	25%	24 2-3%

MALLEABLE FITTINGS.	Black	Galv.
Malleable Fittings, Class A, lb.	0.50	0.62
Do., Class B, lb. net	0.22	0.31-33
Do., Class C, lb. net	0.15	0.21

Advance Of 5% In Various Valves

VALVES.—An advance of approximately 5 per cent. has been made effective in the price of ground work valves, compression work, cushion work, Fuller work, basin cocks, bath cocks. Ground is now quoted at a discount of 50 per cent., compression work standard at 52 per cent. and high grade at 45 per cent. Cushion work is quoted at 46 per cent. off list, Fuller work standard at 50 per cent., and high grade at 43 per cent. Basin cocks, Nos. O, 1 and 2, at 46 per cent. Bath cocks are quoted at 53 per cent. Demand for valves and steam gauges is reported to be still good.

	Discount off list
Ground Work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	45
Basin Cocks—	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	40
Radiator valves, Jenkins disc	40
Radiator valves, quick opening	40

Oakum Market Held In Steady Position

OAKUM.—There was a continued fair demand for oakum during the time since last issue with prices holding steady. Fairly good quantities of oakum are being taken by the shipbuilding trade and with the development of this industry in Canada the demand is expected to grow.

		Per 100 lbs.
Best American	....	$21.00
U.S. Navy (American)	....	20.00
Plumbers' Spun	9.50	10.50

Sheets For Range Boilers Still Scarce

RANGE BOILERS.—There has been very little improvement in the situation with respect to raw materials for the manufacture of range boilers. Unable to get orders placed for galvanized sheets in the United States, some Toronto concerns have been casting around in the Canadian market for available odd stocks. Jobbers in Montreal have been able to supply Toronto manufacturers with small quantities. The situation for manufacture of range boilers is not an encouraging one. Prices remained unchanged since last issue.

30-gallon range boilers, standard	$13.00
35-gallon standard	14 50
40-gallon standard	15.50
52-gallon standard	28.00
30-gallon extra heavy	17.00

Furnaces And Gas Ranges Advance 10%

STOVES, ENAMELWARE.—Following the advance recorded in coal and wood ranges, which took place since last issue, the prices on furnaces and gas ranges have been marked higher in price to the extent of 10 per cent. This was the same amount of advance recorded in stoves. There is a continuation of shortage of supplies in gas, electric and oil stoves. Shipments of stoves and ranges are now going forward on orders that have recently been placed. Certain lines of oil stoves are in very firm market, and advances would not come as a surprise.

Black Sheet Range Has Been Narrowed

SHEETS, PLATES. — A narrower range on black sheets prevailed during the week, with an increase of 50c per hundred on the lower quotations of last week. Some arrivals of black sheets were reported from the mills during the week, but stocks locally are light. Some light stocks of galvanized sheets are reported to be on the way to this centre, but they are not sufficient to take care of the needs of the trade for any length of time. Dealers have been in the market endeavoring to place orders in the United States, but one concern reports that no less than six concerns have refused absolutely to take further orders on galvanized sheets. There has been a further advance of $1 per hundred on galvanized sheets in the United States, which puts the price laid down in Canada higher than they are selling for at present. However, this does not matter so much, as the mills will not accept any further business at these prices. Galvanized sheets are very firm, the more general market quotation is $12 on 10¾ oz. Prices were in creased 50c per 100 lbs. on black sheet gauges, Nos. 18-20, 22-24, 26 and 28 during the week. There is a strong probability that on gauges Nos. 10 and 28, there will be an advance in the near future, as stocks of these sizes are not heavy, and dealers are unable to place orders for replenishment. Other gauges are in fairly good supply and may hold steady.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$	$10 50
12 gauge	10 05	10 60
14 gauge	9 95	10 65
16 gauge	10 00	10 75
18-20 gauge	9 80	10 30
22-24 gauge	9 85	10 35
26 gauge	9 90	10 40
28 gauge	10 00	10 50
29 gauge	10 10	....
3-16 inch plate	....	11 10
¼-inch boiler plate	....	11 00
GALVANIZED SHEETS—	**Per 100 lbs.**	
10¾ oz.	....	$12 00
U.S. 28	....	11 70
U.S. 26	....	11 40
22 and 24	....	11 25
18 and 20	....	11 10
16	....	10 95
14	....	10 85

F.o.b. Hamilton, Toronto.

Conductor Pipe And Eavetrough May Go Up

CORRUGATED SHEETS, EAVETROUGH.—There is a very firm market for eavetrough and conductor pipe, as manufacturers state the finished product at present prices is selling for less than the flat sheets. It is highly probable these lines will be advanced in the near future. Corrugated sheets, which are closely allied in manufacture to eavetrough and conductor pipe, are in continued firm market. The concern that had withdrawn prices last week was still out of the market at the time of writing. Demand for corrugated sheets is reported to be keeping up fairly good. One concern is not quoting for immediate delivery on metal siding and shingles, as they are unable to fill further orders for a week or ten days hence.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7 20
No. 26 gauge	9.60-10.00	....

Prices on gauge Nos. 24, 22, 20 and 18 given only when required by dealers.

Boiler Tubes Again Advance In U.S.

BOILER TUBES.—During the past ten days a further advance of 5 per cent. has been recorded in the price of boiler tubes in the United States, but there was no disposition among local dealers to increase the price in conformity with the advance in primary markets. Although there is a very firm position in boiler tubes in the United States which would warrant an advance in the local market if prices were based on those prevailing in that market, still there has been no inclination to advance by local dealers. There has been a lot of inquiry for boiler tubes, but present prices are already at a high level, and are tending somewhat to curtail consumption. For this reason dealers are endeavoring to keep prices steady without further advances.

1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
3½-inch	70 00	55 00
4-inch	82 00	67 00

Market For Lead And Zinc Products Unsteady

LEAD AND ZINC PRODUCTS.—There is an uncertainty in the market for lead and zinc products, due to the situa-

(Continued on page 42.)



GOSSIP OF THE TRADE

TENDERS AND CONTRACTS AWARDED

Mersea, Ont.—Township Council contemplate drainage system.

Hamilton, Ont.—Engineering Dept. contemplate construction of sewer.

Wingham, Ont.—Town Council contemplate purchase of waterworks supplies.

Tilbury, Ont.—North Township Council will construct tile drainage system costing $100,000.

Toronto, Ont.—Works Commissioner has recommended construction of sewer on Lansdowne Ave., costing $36,670.

Trail, B.C.—Brohley & Co., Fernie, B. C., have contracts for sewer in connection with $50,000 waterworks system.

Glace Bay, N.S.—H. G. Hager, Ltd., of Sydney, have the heating and plumbing contracts for a $17,000 school for the School Board.

Montreal South, Que.—Tenders are invited, and will be received up to July 19 for the laying of sanitary sewers, watermains, valves, fire hydrants, etc. Also for an elevated steel tank.

Niagara Falls, Ont.—The Norton Co., will build this year another unit to their plant at Chippewa for making abrasives. They have installed a waterworks system recently with a mechanical filtration plant.

Hamilton, Ont.—The City Council has appropriated $2,500 to aid the Engineering Department in the preparation of a report regarding the remodeling of the sewer and sewage disposal system. This action was claimed to be necessary if the city would avoid further damage actions.

Toronto, Ont.—L. P. Burns and A. R. Roberts, both of Toronto, have formed a partnership under the name of Burns and Roberts, with offices in the Bank of Hamilton Building, Toronto. Mr. Burns is the head of the Burns Cement-Gun Construction Co., of Toronto, and Mr. Roberts has been acting for some time past as the Canadian representative of the Chapman Valve Mfg. Co., of Indian Orchard, Mass., and of the Cement-Gun Co., Inc., of Allentown, Pa. The new firm will handle contractors' supplies, reinforcing material, valves, factory equipment, etc.

The Galt Foundry Co., Galt, Ont., have recently closed contracts for a large number of their Galt sprinkler stokers to the order of many prominent concerns, some of which are included among the following: The T. Eaton Co., 3 stokers at Toronto and 12 at Winnipeg; Dryden Pulp & Paper Co., Dryden, Ont., 12 stokers; Hinde & Dauch Paper Co., Toronto, 8 stokers; Spanish River Pulp & Paper Co., Sturgeon Falls, Ont., 4 stokers; Hamilton Cotton Co., 6 stokers; Dominion Power & Transmission Co., Hamilton, 3 stokers; City of Brandon, 2 stokers, and Dominion Oilcloth Co., Montreal, 4 stokers.

NEWLY REGISTERED

Montreal, Que.—Standard Plumbing and Heating Company has registered Isidor Cohen.

DROWNED WHILE CANOEING

Winnipeg, Man.—Joseph Mackey, Superintendent of Plumbing at Winnipeg, for the Manitoba Government, was recently drowned while canoeing in the Red River at Winnipeg.

TOOK A BUSINESS TRIP

Messrs. F. H. Lepper and Scholey, plumbers and fitters, of Calgary, recently visited High River, Alberta, on a business trip.

INCORPORATIONS

Montreal, Que.—Lynn Rubber Manufacturing Co. of Canada, Ltd., has been incorporated with a capital of $10,000, to manufacture and deal in rubber goods both wholesale and retail.

Toronto, Ont.—Canadian Sprinkler Equipment Co., Ltd., has been Federally incorporated with a capital of $50,000, to manufacture and instal fire prevention apparatus and engage in the business of electrical, civil, water supply engineers, plumbers and steamfitters.

Toronto, Ont.—H. Stainton, Limited, has been incorporated with a capital stock of $40,000 to conduct a general plumbing, heating and sheet metal business, and to deal in plumbing, heating, engineering and other supplies, and to take over the present businesses of H. Stainton and Stainton & Michael.

OPPOSE FREIGHT ADVANCE

The railways found solid opposition at the hearings before the Board of Railway Commissioners held at Winnipeg last week for the purpose of considering a proposed freight classification. Representatives of every important industry in Winnipeg presented evidence of a convincing character against the increase. In many cases the proof was so strong as to indicate paralysis of business in certain lines. So many witnesses had to be heard on the subject of revising the demurrage rules and on the re-classification plan that the commission was not able to take up the percentage increase asked by the roads. It was shown by nearly every industry that the proposed new classification, in itself, was an increase in rates more to be feared than the percentage increase. On the demurrage question all shippers stood firmly for an equitable rate, but none believed the $3 a day as a starter after the two free days was justified. The Canadian Manufacturers' Association approved of the proposed increaes in freight rates.

AMERICAN SANITARY ENGINEERS' CONVENTION IN GRAND RAPIDS

The American Society of Sanitary Engineers have planned to hold their annual convention on August 1, 2, and 3, in Grand Rapids, Mich., this year.

This society is composed of some of the most noted men in the trade on this continent, many of whom are interested to no small degree in Canadian affairs.

The members conduct a great deal of research work during the year, and report on their accomplishments at the annual meetings. The problems taken up are as follows: Water supply; water purification; plumbing; drainage; sewerage; sewage disposal and standardization.

From what can be learned, there has been a lot of work done during 1916-17, and some splendid reports will be submitted. The SANITARY ENGINEER hopes to be able to give its readers some account of the proceedings soon after the convention closes.

One thing we must admit in Canada and that is that very little research work is done on this side, a fact which is certainly to be regretted. We appear as a whole to be content to just plod along in a blind effort to "get there" any old way.

As far as the writer can learn, the only real practical research work that was ever conducted in this country was that done by the Canadian Institute of Sanitary Engineers in the years 1913 and 1914, when roof terminals and standardization of soil pipe and fittings were the subject undertaken.

WOLVERINES FROM GRAND RAPIDS VISIT TORONTO

The Grand Rapids Wolverines paid a visit to "THE SANITARY ENGINEER"

office, July 11, after having toured by auto from the city of Indianapolis.

Mr. Chas. H. Bakemeyer and family, and Mr. W. M. Dunn, both representatives of the Wolverine Co., of Grand Rapids, are the "Wolverines" referred to. They were escorted by our friend, Ed. Needham, one of the Canadian representatives. Mr. Bakemeyer asked the SANITARY ENGINEER to mention that he regretted not being able to call upon more of his old friends, but time would not permit. He sincerely hoped that those whom he was unable to call upon would not feel they had been overlooked. Mr. Bakemeyer said they had a splendid trip. Leaving Indianapolis, July 2, calling at Columbus, Ohio, and Cleveland. from there to Niagara Falls, and through Hamilton to Toronto, arriving Thursday, July 5. Mrs. Bakemeyer and son will remain in Toronto for a few weeks, while Messrs. Bakemeyer and Dunn will return this week, traveling via Chatham. Mr. E. T. Needham will be one of the party as far as Detroit.

Our friends reported that the country all the way looked splendid. Roads were good until they struck Ontario. and in this connection it was learned that they had been warned about the bad roads into Toronto, which proved to be the worst they encountered throughout the whole trip.

In conclusion we might say that both Mr. Bakemeyer and Mr. Dunn looked to be in the pink of health, and wished to be remembered to each and every one of their Canadian friends.

EVER A BUSY BIRD

The many friends of Mr. and Mrs. John A. McLaren, of Galt, will be interested to know that that friendly bird the stork paid a visit recently at their home and left them a fine daughter, Miss Mabel Jean. Mrs. McLaren and daughter, we are told, are doing well.

THE SANITARY ENGINEER desires to join the friends of Mr. and Mrs. McLaren in wishing them much joy in their new possession.

It might not be out of place to mention that Mr. McLaren was the founder and general manager of the Galt Brass Company, and to many friends it may not be generally known that he has severed his connection recently with that company. We will no doubt hear at no very distant date of new plans which are under consideration whereby Mr. McLaren will again become interested in some venture which will again bring him into close touch with his many friends in the plumbing and heating trade.

AN EARNEST APPEAL TO THE TRADE

(Continued from page 19.)

As stated before, the above is simply a suggestion offered by the SANITARY ENGINEER which feels very deeply in this matter for many reasons.

The matter in all honest cannot be side-tracked, and should not be, particularly when we all know how our returned men would appreciate such employment. It would bring them back into the same environments, amongst men with the same common interests in life, and the positions would be worthy of the granting.

These men too, would be rendering a dual service. First in safeguarding the public from the "Jerry curbstone plumber," the manufacturer of cheap shoddy lines, and again, they would assist in raising the standard of the whole trade. May we therefore receive a few expressions of opinion or ideas from some of our readers on this subject?

It would only be fair however to state that our suggestion somewhat along this line is already being given some consideration in one or two small towns.

A TYPOGRAPHICAL ERROR

We wish to correct an error which appeared in the advertisement on the front cover for Empire Mfg. Co., in the July 2 issue.

The second paragraph read as follows: "There's no other bibb made in Canada just like the "Kitchener". Read what a user says. He has had a pair of "Kitchener's" in use over fifty years.

This should have read: Two years.

We regret the error very much and take full responsibility for the statement, because of the fact that the "Kitchener" bibbs are comparatively a new line in Canada.

ALL IN THE STATE OF MIND

If you think you're beaten, you are,
If you think you dare not, you don't,
If you'd like to win, but you think you can't,
It's almost a cinch you won't.
If you think you'll lose, you've lost,
For out in the world we find
Success begins with a fellow's will,
It's all in the state of mind.

Full many a race is lost,
'Ere ever a step is run,
And many a coward fails
Ere even his work's begun.
Think BIG and your deeds will grow,
Think SMALL and you'll fall behind.
Think that you can, and you will.
It's all in the state of mind.

If you think you're outclassed, you are,
You've got to think high to rise.
You've got to be sure of yourself before
You ever can win a prize.
Life's battles don't always go
To the stronger or faster man,
But soon or late, the man who wins
Is the fellow who THINKS HE CAN.

—Anonymous.

A SILENT W.C. TANK FILLER

(Continued from page 35.)

The valve closes with the pressure, so that it will hold tight under any pressure. A spoon or drag break which drags through the water as the valve is closing, prevents what is known as water hammer, which would occur if valve were to close too quickly.

The ball float is merely a gauge to adjust height of water to a certain level in tank and allow the valve to close. It does not assist in any manner to close the valve or to keep it closed.

When the operating handle of the tank is turned, it lifts the flush valve to allow the water in tank to discharge into bowl; by this same operation the water is turned on by means of a specially constructed member inside of tank.

This is all done in one operation. The valve now opened is automatically held open during the filling of the tank until the water has again reached the level of the ball gauge when the valve is released, allowing the valve to close with the pressure.

Further particulars regarding prices, etc., may be procured from the manufacturers, Messrs. Callow & Phillips, 40 and 42 Lombard Street, Toronto.

EQUIPPING FARM HOUSES WITH BATHROOMS

(Continued from page 27.)

out to prospects in the neighborhood. This will be one of the least expensive and most effective methods that can be adopted for advertising these goods.

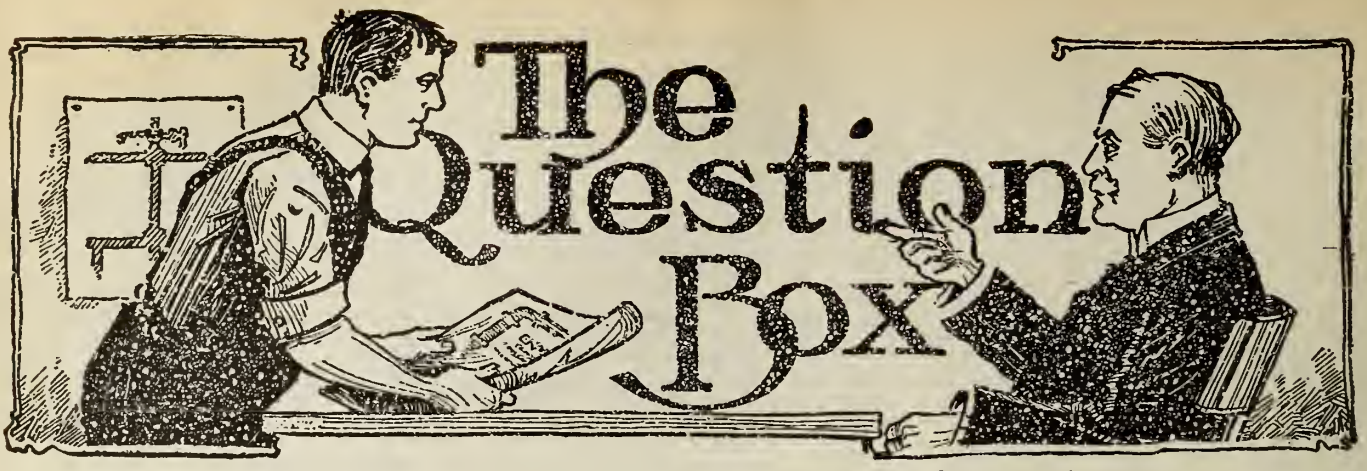
Show Bathroom Complete in Window

In connection with this the dealer might fit up a window, using a typical wall finish, either of enamel paper or a tile background, and a bathroom flooring to secure as complete a representation of the "real thing" as possible. In this window he should place the pieces of plumbing just as they are placed in the regular home. Then he could use along with this, to get the proper "atmosphere," a view taken from a magazine of a country home, and throw out the suggestion in every way at his command that this outfit, so comfortabe and so attractive, can be installed at comparatively small cost in any home in the country.

Print Opinions of Customers

Opinions might also be secured from some of your "pleased" customers—who are enjoying the conveniences you have added to their rural life—and the reading of these views by their neighbors you will find of great assistance in persuading them to "Go and do likewise."

For the merchant who is in a position to install these bathroom equipments the successful experiences of the Port Perry merchants will be a stimulant to a similar exercise of enterprise that will not only be gratifying in the way of increased profits and turnover in a new field, but result in an equally valuable return, by strengthening the bond between the merchant and customers.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

THE DIFFERENCE IN PUMPS

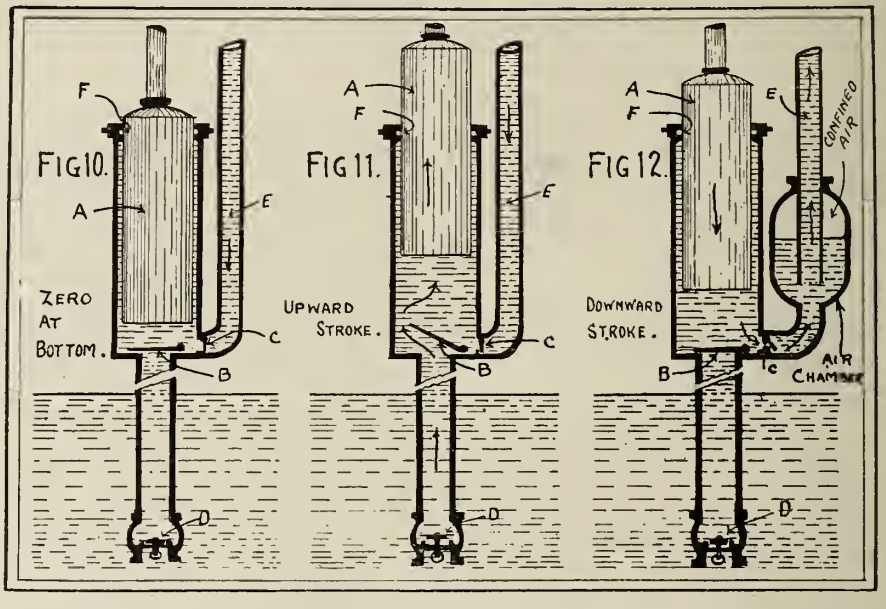
THE following article describes two types of pumps both of which are known as solid plunger pumps. Figs. 10 and 11 are not fitted with air chambers, and therefore would not be suitable for lifting water to any very great height.

It will be seen by referring to the illustrations which appeared on page 28 in the last issue of The SANITARY ENGINEER, that the plungers are fitted with a pump cup leather, this takes the place of the packing F which is necessary with solid plunger pump as shown in Figs. 10, 11 and 12.

There are various forms of packing rings and leathers made for this type of pump, just as in the case with pumps previously shown in this series of articles.

One feature however, which is in favor of the solid plunger pump is the fact that the packing is much more readily replaced and very often a pump such as is described in Figs. 10, 11 and 12 can be repaired, or a leak taken up by simply tightening the gland at the top of the cylinder. Then again, suppose the water is a little gritty, or the solid plunger becomes worn, it being the moving part and not in actual contact with the cylinder, it can be replaced without taking down the pump, while on the other hand the former type of pump, Figs. 7, 8 and 9 described in last issue would require a new cylinder and the pump would have to be taken all apart.

If our readers will refer to the last three issues they will find that we have only taken up and described such pumps that would come under the title of single acting pumps, meaning that no two motions would both draw the water up from the well and force it into some higher location that is, except in the case of Figs. 4, 5 and 6 described in June 15 issue on page 32, and even then, that type of pump would come under the title of a single acting pump because part of the action, that of the downward stroke merely displaces the water from below the piston through the valve A, and the actual work is really performed by the upward motion. So that it will be seen that all pumps so far described are single action pumps.



The solid plunger pump is becoming more popular than ever before, though the writer could never understand why more of them were not used for pumping water. The soda-water and mineral water trade has long ago adopted the use of such a pump with a great deal of success and for a number of reasons. One on account of the fact that it is easier to locate any air leaks, which is disasterous to that industry. Any air getting into the cylinder of a soda water machine, will spoil all the bottled drinks so that if a solid plunger pump is best for such a purpose, it goes without saying that it would be a good pump to use for water supply pumping.

It will be noted that Fig. 12 is fitted with an air chamber. This is necessary where water has to be lifted, or forced to any great distance, the confined air being more elastic than the water, it takes up the shock cause by the sudden stopping and starting of a solid column or confined body of water.

These air vessels should always be placed as near as possible to the cylinder, and at the foot of the delivery pipe. It will be seen in Fig. 12 that on the downward stroke, the water is forced through the delivery pipe and past valve C confining the air in the upper part of the air chamber, this air really being trapped by having the delivery pipe dip down nearly to the bottom of the air chamber, and as the plunger is raised, the compressed air tends to force some of the water up the delivery pipe until assisted by the next downward stroke.

None of the pumps yet described would be termed deep well pumps and would only be suitable for drawing water from 15 to 20 feet though some such pumps have been known to lift water from as deep as 27 and 28 feet, these are exceptional cases and could not be depended upon. The next article will describe a number of double acting pumps, still of the shallow well type.

(Continued in Next Issue)

CATALOGUES

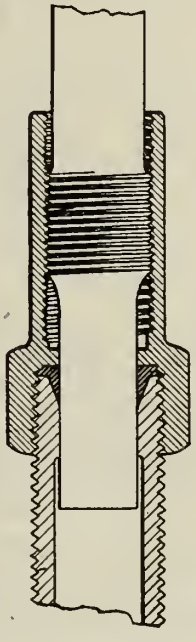
Vaughan Flow Meter.—A bulletin issued by the Spray Engineering Co., Boston, Mass., illustrating and describing the Vaughan flow meter which is a simple and efficient instrument for indicating the flow of liquids in pipes.

ADJUSTABLE

Screw Joint Coupling

for Supply Pipes

(Letters Patent No. 162,577)



The illustration shows the principle of application. The threaded shoulder on supply pipe engages internal thread of Screw Joint Coupling, allowing a total adjustment of TWO INCHES.

In addition to the adjustable feature, PACKING RING effectively prevents the possibility of LEAKS.

The Adjustable Screw Joint Coupling represents a combination of Common-Sense and Experience. It has justified expectations that it would perform an ordinary service in an extraordinarily efficient manner.

Fitted on all Noblo Supplies.

Manufactured by

H. Mueller Manufacturing Co., Limited

SARNIA, ONTARIO

MARKET REPORTS

(Continued from page 37.)

tion in the United States. In that market arrangements have been made by some of the largest producing lead companies in Idaho and Montana for sale to the Government of lead at $8 per hundred. This represents a decline of approximately $3 from the prevailing spot price in New York. It is understood that seven lead producing mines in the western district have agreed to deliver 2,000 tons of lead in July on the basis of 8c. Zinc sheets are also understood to be sold to the Government at prices considerably below the prevailing market price. This is having its effect, and is working toward an easier tone in the market. Locally the market is quiet, with prices unchanged.

Lead pipe, lb.	$ 0 19	....
Lead waste pipe, lb.	0 20	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 17	....
Lead sheets, 3 lbs. sq. ft.	0 17¾	....
Lead sheets, 3½ lbs. sq. ft.	0 17¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 17½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 42	....
Solder, strictly, lb.	0 41½	....
Solder, commercial, lb.	0 40	....
Solder, wiping, lb.	0 40	....
Solder, wire, lb.	0 45	....
Zinc sheets, per lb.	0 26	....

Heavy Copper And Heavy Zinc Down

OLD MATERIALS.—With weakness in the market for metals in the United States a corresponding weakness has developed in the market for some old materials, particularly in heavy copper, where a decline of ½c to 1c per pound was recorded in the prices being paid by dealers. Dealers are paying 25½c to 26½c for this commodity, as compared with 26c to 27½c last week. Prices being paid by dealers in old materials were quoted down 1c per pound on heavy zinc. There is weakness in the market for old materials. due to the amount being offered and to the slackness of demand from the consuming mills.

Tea lead	$ 0.08¼	.....
Heavy lead pipe	0.11	.....
Yellow brass	0.15¼	0.15½
Red copper	0.22½	.....
Light brass	0.10	.....
Heavy zinc	0.07½	.....
Heavy copper	0.25½	0.26½
Old cast iron, per ton	....	25.00

Ingot Metal Markets Easier In Tone

INGOT METALS.—There has been a slightly easier tone to the ingot metal market during the week. Lead and copper have eased off slightly in price.

TIN.—The tin market is the only one that has shown any marked strength during the week. The U. S. market has shown considerable strength, and spot Straits is scarce. Locally the price is 63c-65c lb.

LEAD.—The lead market has been somewhat easier during the week. Locally the range of prices has declined to 14¼-15c lb.

SPELTER.—No price change is noted locally, although the U. S. market has been dull and lower. The local price remains at 11½c-12½c lb.

COPPER.—The market is quiet, and reports from the United States indicate that there is great uncertainty as to future developments. Local prices remain at 63c-65c lb.

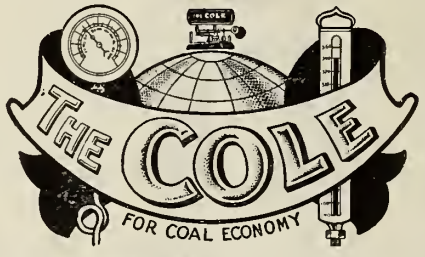
ALUMINUM.—The situation in aluminum is unchanged, with quotations still at 67c-68c lb.

ANTIMONY.—The U. S. market is weak and stagnant. The price locally remains at 25c lb.

PIG IRON.—The pig iron market in the States continues very firm, and prices are still advancing. The general situation is practically unchanged, but there is considerable weakness in some quarters about the possibility of Government regulation of pig iron prices. The local situation is unchanged, as domestic pig irons are still off the market.

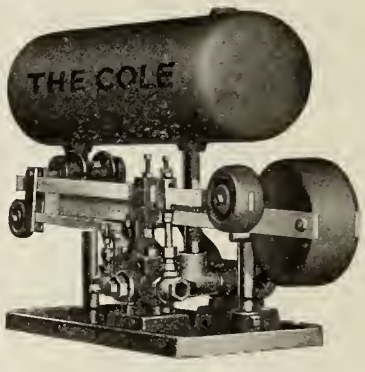
INCORPORATED

A. B. Jardine & Co., of Hespeler, Ont., makers of wookworking machinery, pipe threading and blacksmiths' tools, etc., has been incorporated at Ottawa with a capital of $300,000.



CONDENSATION

Handled in the proper way is being done by steamfitters thruout the country. Are you one of them?



Information regarding the "Cole" Return Trap System, gladly furnished upon request to

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838 Dundas St., TORONTO

FOR SALE

PLUMBING AND HEATING BUSINESS FOR sale, in City of Kitchener; 12 years established and lots of work to do. Apply at Box 701, Sanitary Engineer.

3 BIG REASONS WHY YOU NEED

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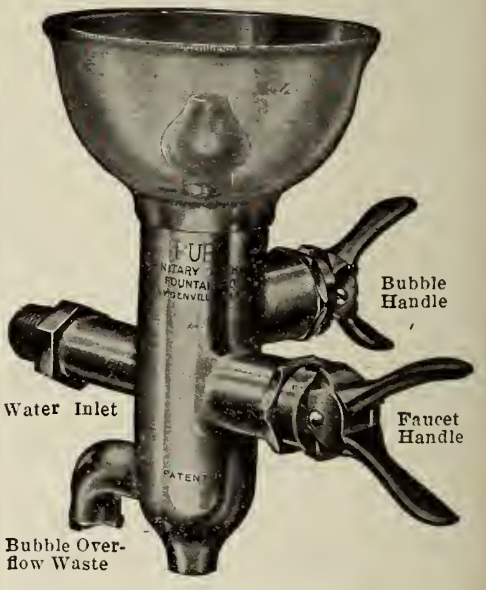
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2. Puro will cut your water bills 15% to 35%.
3. PURO will safeguard the health of your employes and raise the standard of efficiency.

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PURO equipment is not expensive—the first cost is *low* and the up-keep *nothing*. Easily attached; positively fool-proof. Let us make you a special proposition for a try-out in one of your departments. Write us now—to-day—giving us the number of men; an inquiry will cost you nothing.

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YOUR WATER SUPPLY

Puro Sanitary Drinking Fountain Company
143 University Ave.
TORONTO, CANADA



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UNDERWOOD TYPEWRITERS.—Modern visible machines equipped with such improvements as back spacer, bi-chrome ribbon, tabulator and automatic ribbon reverse. Five year guarantee. Sold for cash or payments. Free trial. Send for proposition to-day and save more than half regular price. Address, Arthur O. Secord Co., Limited, Dept. 2, Brantford, Ontario.

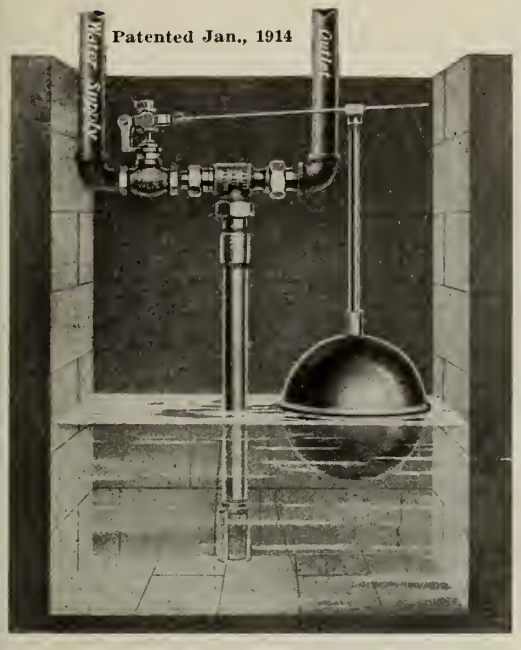


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Cleaning screws, and drain checks prevent flooding Machinists, Brass Finishers and Plumber ialties.

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MORRISON
Automatic Cellar Drainer



A simple, durable, automatic device for draining cellars, wheel pits, furnace pits, cesspools, foundations, and for any purpose where it is necessary to remove water economically from one level to another by water pressure.

The operation of the machine is extremely simple, being actuated by the raising or lowering of float as the water level changes in the pit. It operates purely by water. With our patented improvement it works under a far greater range and gives much larger capacities than any other device on the market, so far as we know, operating as low as 10 lbs. water pressure.

The operating limits of other types of cellar drainers range from 15 to 18 feet lift. The Morrison machine lifts as high as 30 feet at 60 lbs. pressure.

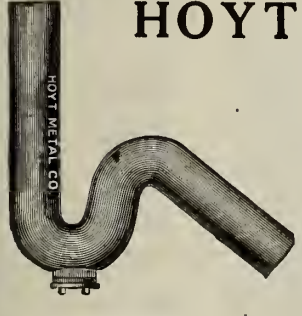
All working parts above water. Nothing to get out of order.

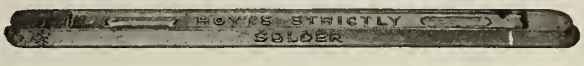
The James Morrison Brass Mfg. Company, Limited

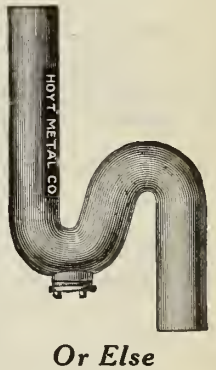
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FROM COAST TO COAST







As time-savers there are none equal to our Wiping Solder Bar or Wire Solder.
Hoyt Lead Traps, bends and waste pipe are in a class by themselves.

Our Mixed Metal Sales Amount To Over $5,000,000 Annually.

Write your Jobber **HOYT METAL COMPANY, TORONTO, ONTARIO** *Or Else Write Us*

New York, N. Y., London, Eng., St. Louis, Mo.



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

Ask your jobber for "Anthes" Syphons and accept no other.

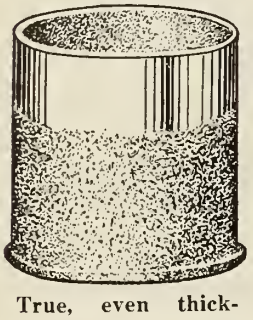
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TORONTO and WINNIPEG



We manufacture sheet lead in any commercial weight per foot, and in any width up to 7′ 6″ to suit our patrons. Guaranteed uniform thickness and temper.

STRAIGHT BRASS FERRULES



True, even thickness, clean metal, free from sandholes, thoroughly dependable.

EASY WIPING SOLDER

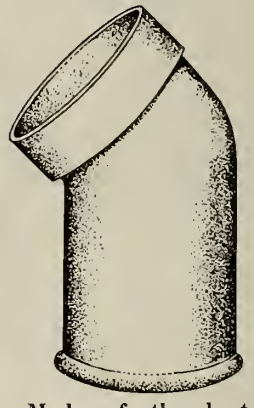


Wiping solder of various quality. None that is not the best value on the market. Easy Wiping is the plumbers' favorite.



Patent Soil or Waste Pipe in lengths of 8 feet

BENT BRASS FERRULES



Made of the best metal for the purpose, clean and easy to tin, and easy to wipe.

WE MAKE

Block Lead

Sheet Lead

Lead Pipe

and

Lead Wool



WE MAKE

Wiping Solder

Solder Nipples

Brass Ferrules

Bar Solder

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A full line of cast iron enamelware baths, lavatories, sinks, drain boards, and a splendid line of cast cement laundry tubs, and all necessary brass goods used by the trade.

Write us for prices. We are headquarters for most of the lines you use.

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TORONTO, CANADA

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MacLean's for August



An illustration by Ben Ward for "Mam'selle Butterfly" in August MacLean's.

Is a Midsummer Number

AN August magazine will be read by most people when the languor of summer heat possesses them, when entertainment more than heavy stuff is most welcomed. Yet something worth while in the way of special articles is desired—this by the thoughtful few.

The August MACLEAN'S is excellently balanced, as you will see from these contents:

CONTENTS

Frenzied Fiction for the Dog Days—(Done by the Dipperful.) By Stephen Leacock.

The Human Side of Conscription. By H. F. Gadsby.

Winning the War in the Air. By Agnes C. Laut.

A Circus Story. By L. B. Yates.

Mam'selle Butterfly. By Arthur Beverly Baxter.

The Captain of the Susan Drew. By Jack London.

An Andy Doolin Yarn. By Hopkins Moorhouse.

A Detective Story. By Robert E. Pinkerton.

The Gun Brand. By Jas. B. Hendryx.

Women and Their Work—A New Department. Review of Reviews—Regular Department.

Yates who writes the Circus Story, was born in Hamilton. He wrote those stories about Paragon Pete and The Singin' Kid in the Saturday Evening Post.

Leacock is excessively humorous in his Dog Days Sketch, in which he talks about summering and simmering.

Miss Laut fancies that the war may be won by the birdmen, and if Uncle Sam produces 100,000 planes, she may be right.

Gadsby sits in the Press Gallery at Ottawa, and writes brilliantly always. His "Conscription" article is in order.

Pinkerton who writes the detective story, "Old Twilight," knows how to write this class of story.

By the way, Lord Northcliffe has promised an article for the September MACLEAN'S.

You can see that MACLEAN'S for August is just the right type for August.

At All News-Dealers 15 cents

The Cost of Selling

SCARCELY necessary, is it? to protest that you must spend some money, much or little, to keep yourself and your merchandise known to your customers and should-be customers.

This you admit, but—DO YOU FOLLOW CLOSE UP THE LEAD OF YOUR CONVICTION?

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Let's look at the cost of close-up work in

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Not a heavy annual cost to canvass the choicest class of farmers in this country—farm homes of greatest prosperity, progressiveness and capacity.

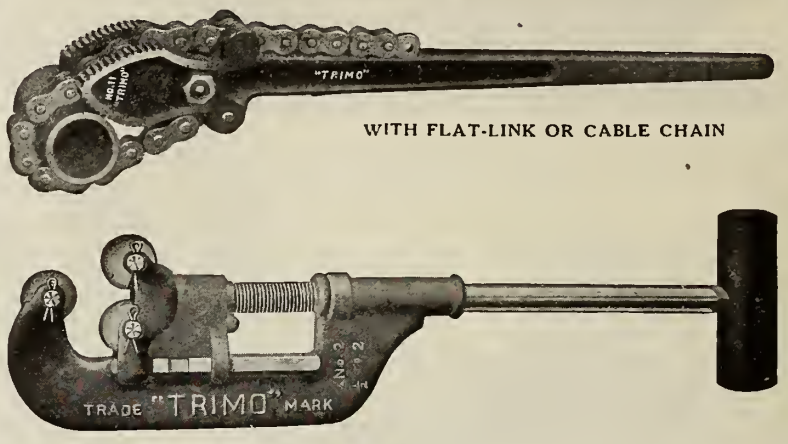
But—are you keeping a salesman always on the job?

You should—and can, at so low a price.

Write in about it.

World-Famed Specimens of the Age of Steel

TRIMO



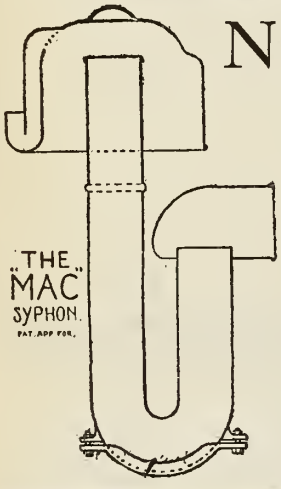
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That it will flush Automatically, and proper intervals. It cannot, nor will not get out of order because it has no moving parts. Prices right. Quality better.

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THE BOILER TO SPECIFY

You take no chances when you specify

KING Hot Water Boilers and Radiators

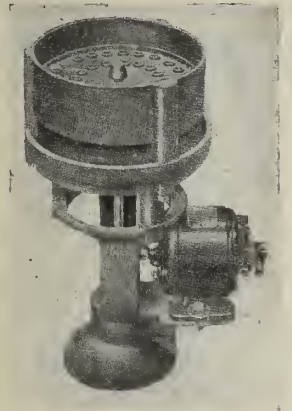
because we guarantee every boiler to live up to the claims we make for them. We assist you to build up a lasting reputation that counts, when we supply you with our goods.



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Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

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NEW DIFFERENT BETTER

The cost of coal is a serious problem to-day. Your customers have all tried to solve it and failed. We have tried and succeeded.

ROTARY OIL BURNER

is the result of our labors. It burns fuel, oil, or kerosene. Can be installed by any plumber. Works in connection with present heater. Installed in the fire-box, gives a terrific fire in a few seconds. Can be turned off instantly when not needed. No trouble to take care of. Big profits for the plumber and an unlimited field.

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235 Congress Street, BOSTON, MASS.

PROGRESSIVE REPRESENTATIVES WANTED EVERYWHERE.

ANOTHER WORD TO THE WISE ABOUT GALVANIZED RANGE BOILERS

In a closed water system an increase in temperature from 72 degrees to 110 degrees will increase the pressure from 60 lbs to 265 lbs.

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Manufacturers of Range Boilers, and Soil Pipe and Fittings



Beaver Die Stocks

Full Thread at One Cut

with the

"Beaverette"

A Compact and Complete Tool

NO CHANGING OF DIES—NO BACKING OFF—NO LOOSE BUSHINGS. These are some of the advantages of the "Beaverette" not found in any other tools. Cuts from ⅛ to 12 inches.

One man can cut a 12-in. thread easily with our tool.

Beaver Pipe Cutters



Make a square, clean cut, and leave no burrs. There's less friction on hot water jobs and less wet steam on steam jobs when the Beaver square-end pipe cutters are used.

Manufactured by

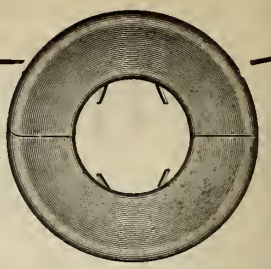
The Borden-Canadian Co.
Toronto, Canada

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OPEN VIEW
NO. 10-A.

The CEILING PLATE that's better



TOP VIEW
NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.



Gem No. 4.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

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BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.

All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

Montreal Works: Lachine, Can.

Mutual Benefit Chats No 5.

The chief accountant of a large firm which advertises in THE SANITARY ENGINEER, said to one of our staff the other day: "Your lessons on bookeeping are the best along this line I have seen for many years." This man was not asked for his opinion, he gave it voluntarily. If these lessons are good enough to attract the attention of a man who understands bookkeeping from every angle, they must be what we are aiming to make them, namely, a help to the man in business. Mr. Sanitary Engineer, with overhead costs increasing by leaps and bounds, you cannot afford to be without a bookkeeping system. Subscribe to THE SANITARY ENGINEER and get the best at less than two cents per lesson.

Advantages in Using

Dart Unions

EASILY CONNECTED—
A ball-shaped joint that makes the connection so long as the nut can be started on its thread.

PERMANENTLY TIGHT JOINTS—
No deterioration of any kind at the joint, nor is the joint affected by expansion, contraction or vibration.

DURABILITY—
The bronze to bronze non-corrosive joint and solid parts eliminate replacement. The union may be connected time after time without expense or bother.

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No up-keep cost, no replacement cost and no loss from leaks.

GUARANTEE—
We will replace 2 for 1 any union bearing our Trade-Mark, that does not give absolute satisfaction and fulfill our claim.

CUSTOMERS—
Are given a satisfaction that ensures you their future business.

ORDER FROM YOUR JOBBER

Manufactured by Dart Union Co., Limited, Toronto, Canada

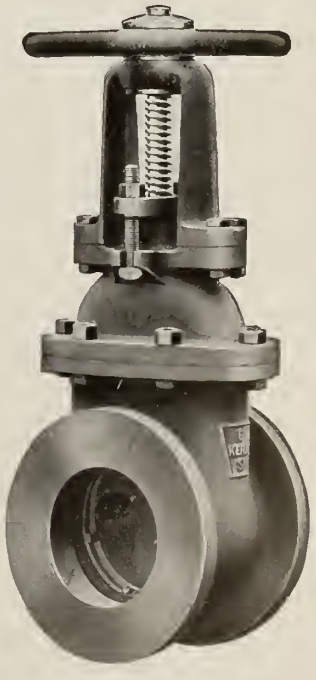


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advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

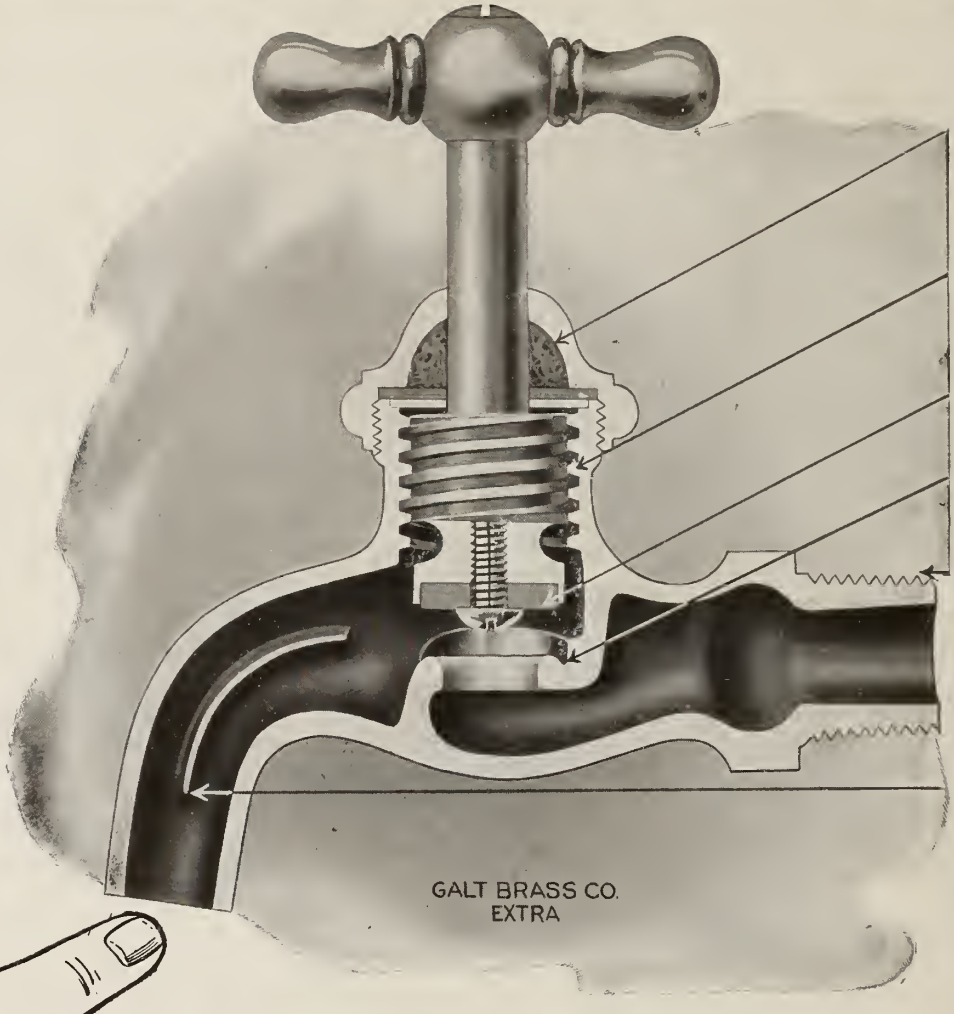
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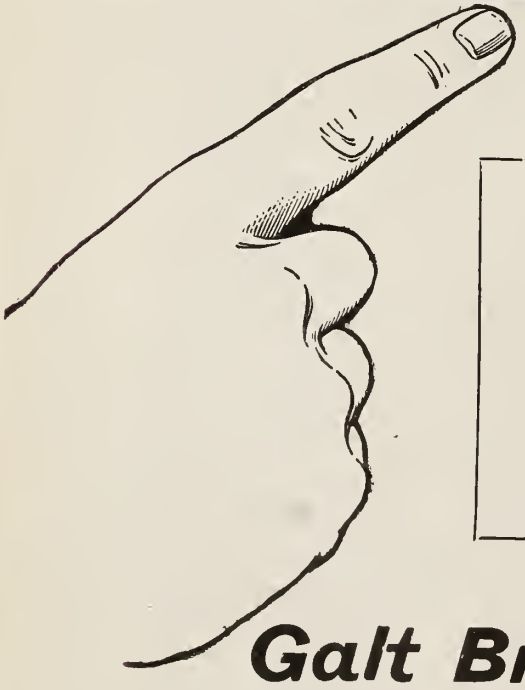
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You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

THE SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, AUGUST 1, 1917 | No. 15

EMPIRE

PNEUMATIC

WATER SYSTEMS

Quality First

FILE COPY

EMPIRE PNEUMATIC WATER SYSTEM OPERATED BY GASOLINE ENGINE.—This system is specially adapted to places requiring large quantities of water at intervals.

The Engine with the Trouble left out.

We show here a Hopper Cooled Engine that will stay cooled. In manufacturing the Empire Engine, the first consideration is the best material and best workmanship, then comes simplicity, and this is the way we get the Engine with the trouble left out. These Engines are especially adapted for Farmers, Isolated Electric Lighting Plants, and Irrigating Plants.

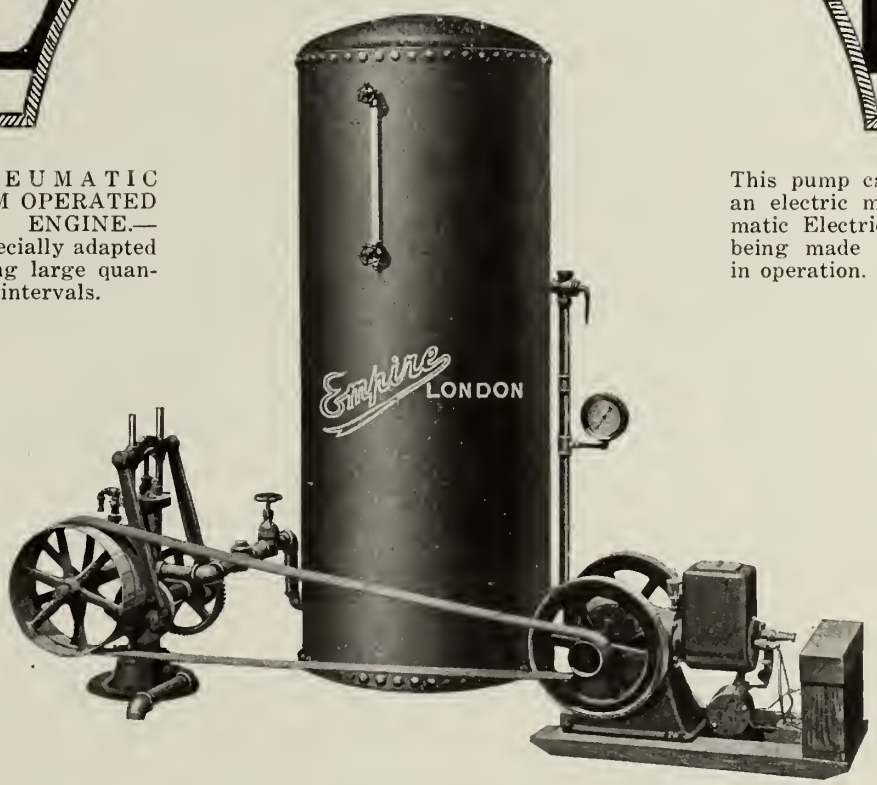


PLATE A1903

This pump can be operated by an electric motor having automatic Electric Switch and thus being made entirely automatic in operation.

Empire Vertical Power

Hydro Pneumatic Pump for shallow or deep wells, with water - cooled air compressor.

Double discharge, backgeared 5 to 1 feet.

The special advantage of this style pump over an independent Air Compressor is that it admits just enough air at all times to keep the pressure tank in proper working condition, whereas, when separate Air Compressor is used, it is often overlooked until tank becomes water-logged.

The above pump, running at the rate of 40 strokes per minute, has a capacity of 360 gallons per hour. It can be made for either deep or shallow wells. The tank generally used has a total capacity of 420 gallons, which, allowing one-third space for air, will deliver 280 gallons of water with one pumping. The engine shown is a two H.P. being used for shallow well pumps and a 3 H.P. for deep well pumps.

The complete System includes: Tank, Pressure Gauge and Water Gauge, Pump, Gasoline Engine, two one-inch Gate Valves, one one-inch Check Valve, one ½-inch Compression Bibb, and one ¾-inch Stop and Waste.

WRITE US FOR FULL PARTICULARS

EMPIRE MANUFACTURING COMPANY, LIMITED

LONDON *TORONTO*

FILE COPY

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

ONTARIO:
Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO., LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Making Good

Whatever the need for rubber may be, your selection of that need from the Dominion Rubber System products is a sure guarantee for the quality of the article you purchase.

Dominion Rubber System products are made for service. That is our *first* consideration. That is why they "make good" under the severest tests.

For service, value and economy, Dominion Rubber System products will easily be your *best buy*.

Write our nearest branch for prices of the rubber needs you require.

Canadian Consolidated Rubber Company, Limited

Head Office - - MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

WE SPECIALIZE

In the Manufacturing of

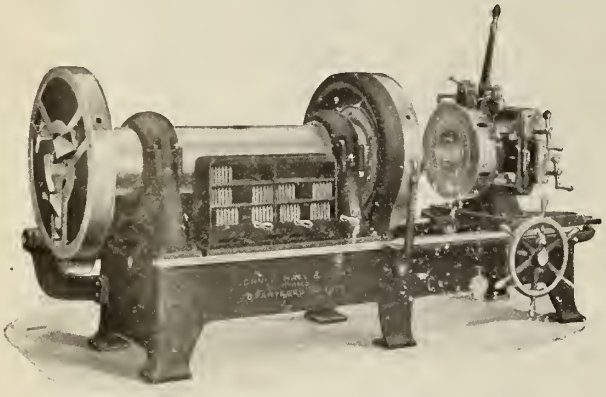
CAST IRON SOIL PIPE AND FITTING

as well as

GALVANIZED RANGE BOILERS AND EXPANSION TANKS
FOR HEATING SYSTEMS

TORONTO HARDWARE MFG. CO., LIMITED

Pipe Machines of Merit



THE HALL No. 8

Duplex Improved Gear Box Driven. Capacity 2½ in. to 8 in. inclusive.

Note the drive belt at rear out of operator's way. Elevated die cabinet, control lever and speed levers all convenient to operator's right hand. Sliding die head.

These machines are equipped with a friction clutch, enabling operator to revolve pipe a few inches, if necessary.

Pipe Machines ranging from ⅛ to 18".
Nipple Machines ranging from ⅛ to 4".
Roller Pipe Cutters ranging from ⅛ to 4".

Delivery from stock.

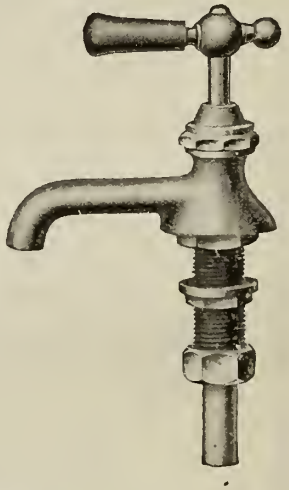
Write us for full particulars and prices.

John H. Hall & Sons, Ltd., Brantford, Can.

Joseph Breeden & Co., Ltd.

NEW MILL WORKS

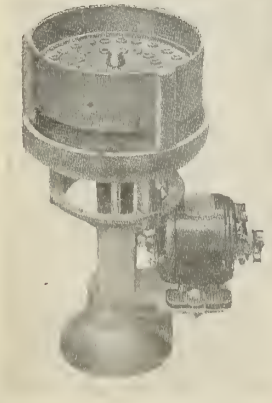
Fazeley Street, Birmingham, England



MANUFACTURERS OF

HIGH CLASS

Steam and Water Fittings



NEW DIFFERENT BETTER

The cost of coal is a serious problem to-day. Your customers have all tried to solve it and failed. We have tried and succeeded.

ROTARY OIL BURNER

is the result of our labors. It burns fuel. oil, or kerosene. Can be installed by any plumber. Works in connection with present heater. Installed in the fire-box, gives a terrific fire in a few seconds. Can be turned off instantly when not needed. No trouble to take care of. Big profits for the plumber and an unlimited field.

NATIONAL ROTARY OIL BURNER COMPANY

235 Congress Street, BOSTON, MASS.

PROGRESSIVE REPRESENTATIVES WANTED EVERYWHERE.

The DUNHAM VAPOR HEATING SYSTEM

Our Service Plan:

Heating Contractors everywhere should know about the Dunham plan of Co-operative Service in connection with the use of the Dunham Vapor Heating System.

The Dunham Systems of Heating are recognized by users as the best in Heating. Our efforts in the past have been directed by the thought of producing the most efficient, simple and reliable heating system possible. The marked satisfaction being rendered users of Dunham Systems justifies us in being proud of the accomplishments of Heating Contractors who are co-operating with us.

The National Publicity which has been given the Dunham Vapor System of Heating is helping to convert many from the old-fashioned, wasteful methods over to sanitary, healthful and comfort-producing Dunham Heat.

We want the Trade to realize the opportunity for giving real Heating Service through the installation of Dunham Vapor Systems.

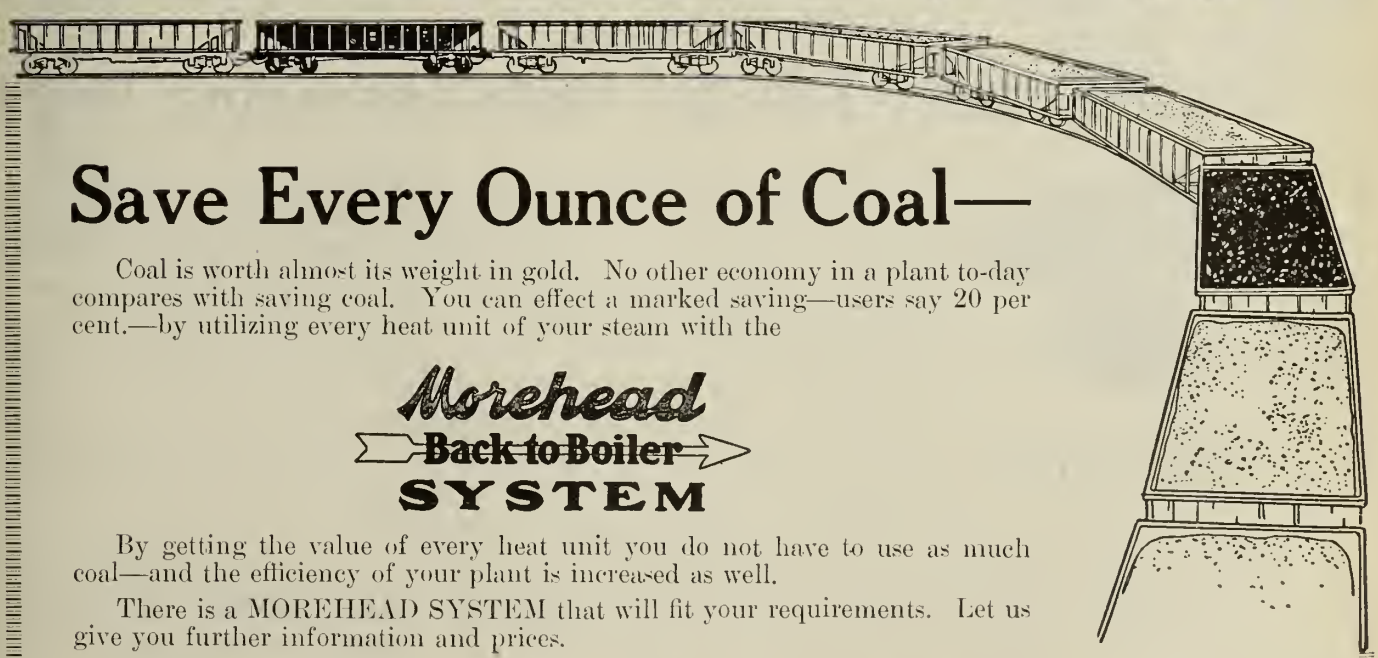
Don't delay, our plan of Service will appeal to you. If you are not already acquainted with the facts, write us to-day.

C. A. DUNHAM COMPANY, LIMITED, Toronto, Canada

Branches and Addresses:

OTTAWA, 214 Booth Building
MONTREAL, Room 20, 11 St. Sacrament St.
FORT WILLIAM, Plumbing & Engineering Supply Company
VANCOUVER, 520 Duncan Building
HALIFAX, McCurdy Building
CALGARY, Metals, Limited
WINNIPEG, 405 Tribune Building

Save one out of five Cars



Save Every Ounce of Coal—

Coal is worth almost its weight in gold. No other economy in a plant to-day compares with saving coal. You can effect a marked saving—users say 20 per cent.—by utilizing every heat unit of your steam with the

Morehead Back to Boiler SYSTEM

By getting the value of every heat unit you do not have to use as much coal—and the efficiency of your plant is increased as well.

There is a MOREHEAD SYSTEM that will fit your requirements. Let us give you further information and prices.

The Canadian Morehead Mfg. Co.

Dept. "C"

WOODSTOCK, ONTARIO

STOP THE LEAKS

WITHOUT SHUTTING OFF WATER

BY USING WOLVERINE TEMPERED TOOL STEEL

TAP PLUGS

For repairing Leaks in Boilers, Radiators, Cast Iron Pipes, etc.



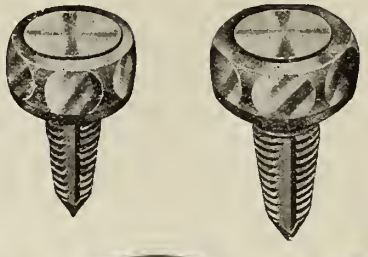
EASY TO OPERATE TEMPERED TOOL STEEL

TAP PLUGS

The only Tool required is an ordinary wrench, for starting and screwing into fixture

Sharp Cutting Milled Slot

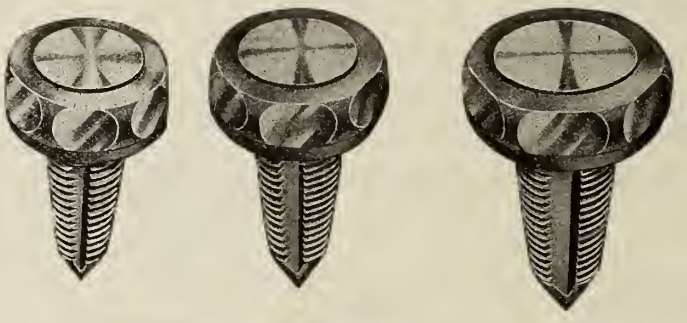
WRITE FOR PRICES



Sharp Cutting Threads

SEE CATALOG "C"

Canadian Wolverine
COMPANY, LTD.
Chatham - Ont.

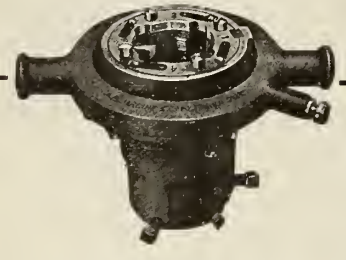


Canadian Wolverine
COMPANY, LTD.
Chatham - Ont

ONE MAN DOES WORK OF TWO

WITH THE

"Jardine" and "Toledo" Pipe-Threading Tools



"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of **"JARDINE"** OR **"TOLEDO"** DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear, too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

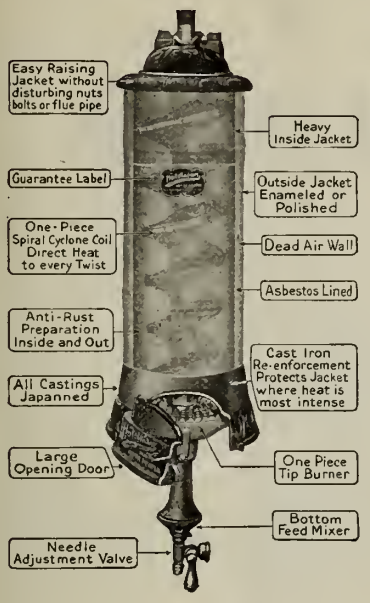
WRITE FOR CATALOG OF COMPLETE INFORMATION.

A. B. JARDINE & CO.

HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.

Service-Speed-Economy



The Hotstream WATER HEATER

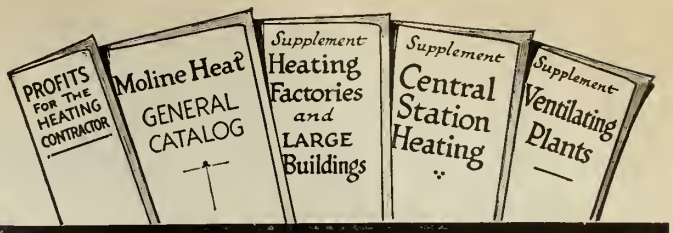
BEST FOR BAD WATER

Quality Survives

The Hotstream Heater Co.

CLEVELAND, OHIO

W. H. CUNNINGHAM, 98 Kingswood Rd,. TORONTO
Canadian Representative



These Valuable Books *Free!*

Each one is worth big money to you. Every heating contractor should have them. They cover all the latest money-making ideas in figuring and installing steam heat—hot water heat—vapor heat—and vacuum systems.

These books will help you to land more orders and increase your profit on every job. Write for them at once. They are absolutely ***FREE!***



Moline Illinois

THE CRANDON NO. 42 TANK TYPE THERMOSTAT



is a thoroughly reliable automatic control for hot water.

The thermostatic bar comes in direct contact with heating surface of tank or pipe, insuring perfect control.

Attractive discounts.

Write for booklet to-day.

DARLING BROS., LTD.
MONTREAL, CANADA

BRANCHES: TORONTO and WINNIPEG
Agents:
HALIFAX, ST. JOHN, CALGARY, VANCOUVER

"B & C"

COMBINATION
Floor and Ceiling
PLATES



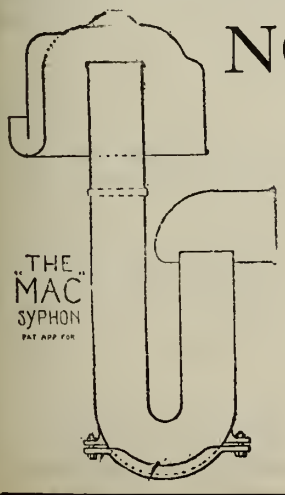
No. 10 Steel
3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

Send for catalog of complete line.

MANUFACTURED EXCLUSIVELY BY THE
Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:
W. H. CUNNINGHAM, 98 Kingswood Rd., Toronto, Canada.



NO SYPHON JUST LIKE A "MAC"

It bears our unconditional guarantee

That it will flush Automatically, and proper intervals. It cannot, nor will not get out of order because it has no moving parts. Prices right. Quality better.

Write us for full particulars.

We can make prompt shipments from stock.

WEST TORONTO FOUNDRY COMPANY
CORNER OF MULOCK AND JUNCTION
WEST TORONTO

"Standard"
"Perfection" Built-In Baths

Made in One Piece Enamelled All Over



These Baths represent the last word in design and finish, and are made to build into Right or Left Hand Corner or into a Recess.

The "Perfection" Built-in Bath is only 17½ inches high, therefore convenient. It builds into walls and floors, the absence of all dust-collecting cracks and corners, meaning bathroom sanitation.

Made in 5 and 5½ foot sizes.

Illustrations on request.

Write the nearest dealer.

Standard Sanitary Mfg. Co.
Limited

General Office and Factory, Royce and Lansdowne Aves., Toronto, Ontario

Toronto Store:
55-59 Richmond Stree. East

Montreal:
4 Beaver Hall Square

Winnipeg:
76 Lombard Street

Hamilton Store:
20-28 Jackson Street West

Vancouver:
202 Crown Building

"MADE IN CANADA"

The Businessman's Mind

BANKERS are supposed to have a particular character of mind; Lawyers and Doctors likewise; Teachers also. These minds have both narrowness and breadth. They see widely and deeply in their own realms, and narrowly and sometimes shallowly in regard to matters outside their particular worlds. At least, this is the common supposition.

THE Businessman — What should be the character of this mind? — What is the mind of the Manufacturer, the Wholesaler, the Retailer? Certainly the Businessman's mind should be broad. It should be something of the Banker's, something of the Financier's, something of the Statesman's. The Businessman should see broadly. The horizon of interest and of inquiry for him should be a far one.

The happy thing about it is that the business man—manufacturer, jobber, retailer—can have the far outlook—this by the reading each week of a newspaper with a far outlook—

The Financial Post
OF CANADA

This is a business man's paper—it is a paper for bankers, for investors, for trustees, for financial men. But it is also a newspaper for **merchants,** very much so.

Merchants need to know markets and market tendencies and market factors. They need to know conditions, local and remote. They need information to buy right and to sell safely.

And the knowledge they need they can have for the insignificant sum of $3 annually.

THE FINANCIAL POST is a most readable paper—positively enjoyable to the layman reader. It makes any man broader minded, and every business man a better business man. Growth in bigness at $3.00 a year!

Send for free sample copy to the Publishers, or sign and mail attached coupon.

THE FINANCIAL POST OF CANADA 1917
143-153 University Avenue, Toronto.

Please enter me as a regular subscriber, commencing at once. If I am satisfied with the paper I will remit $3.00 to pay for my subscription on receipt of bill.

Name.....

Address .....

TRUE PATRIOTISM

The day will come for just appreciation of the true patriot.

The vocation of the soldier no doubt will pass away after this war is over.

As surely as human progress is to continue, just so surely will nations cease to learn war and machine guns, and battleships will be relegated to the scrap heap.

PATRIOTISM involves much more than willingness to risk one's life in battle for his or her country. It involves also the nation's economic development, and puts every citizen under certain obligations.

The goods we bought from Germany helped her to build battleships and arm men to kill.

The goods we bought from Germany gave her men the practical manufacturing experience which we lacked. We were too ready to buy goods made to our hand, and therefore built Germany's mechanical and industrial enterprises.

The true patriot is that man who is enthusiastic about the possibilities of his own country doing all in his power to help build it up. Not always counting the personal profit and loss.

Canada before the war was a buying nation, she was slow in developing her own resources, because other older nations appeared to be able to undersell, but as the old saying is, "We were carrying coal to Newcastle."

If our war debts are to be paid and paid quickly, we must capitalize on our own products. Be patriotic in practice and help build up our own industries. We need the money.

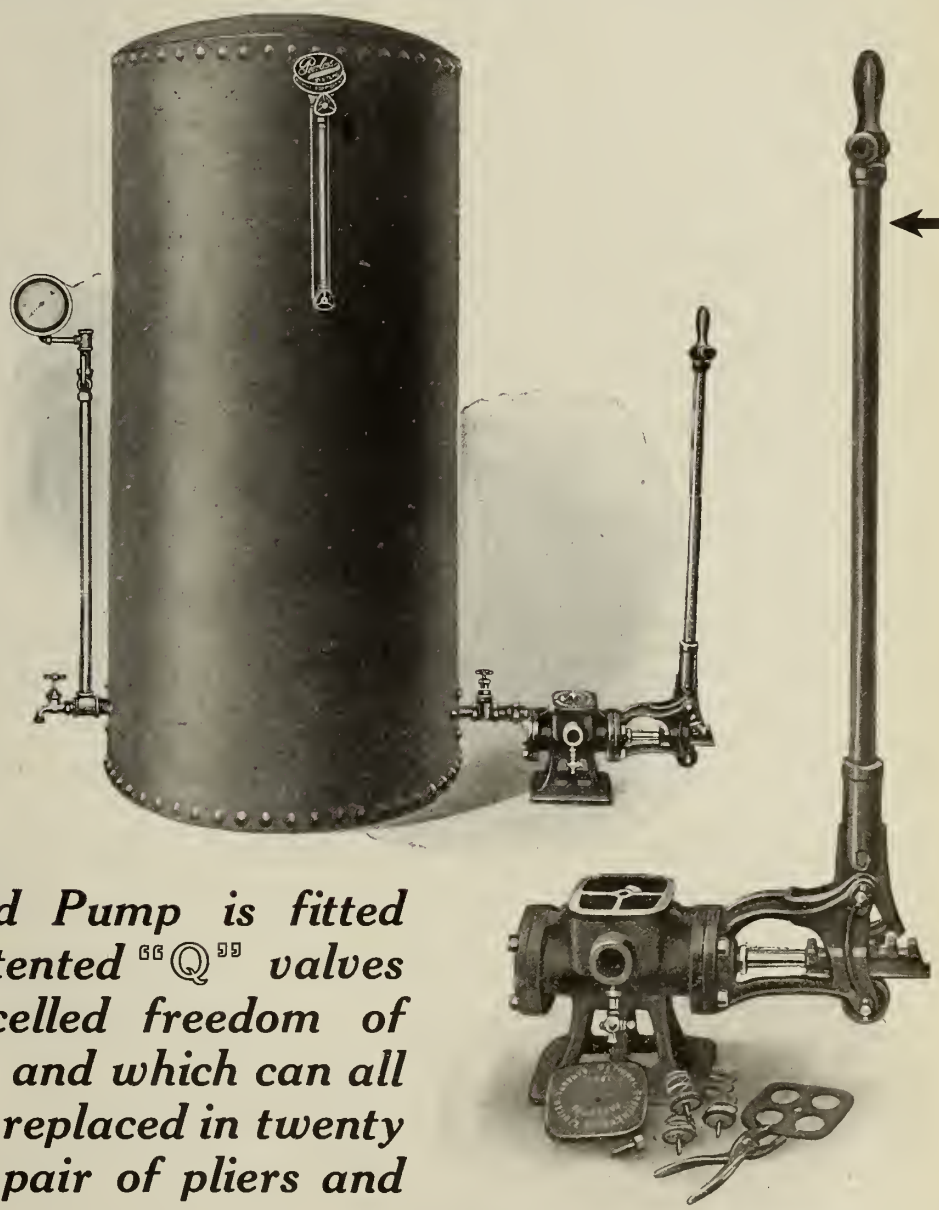
WATER Peerless SYSTEMS

MADE IN CANADA

112 Series Peerless Water System

Every item illustrated is shipped to you.

It's a serious matter to be short a fitting ten miles from home.



The "Peerless" is the only line of Water Systems built in the British Empire

The O.16 Hand Pump is fitted with a set of patented "Q" valves providing unexcelled freedom of water discharge, and which can all be removed and replaced in twenty seconds—just a pair of pliers and one nut.

National Equipment Company, Limited

Toronto, Canada

"When writing advertisers please mention that you saw their advertisement in the SANITARY ENGINEER."

THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, AUGUST 1, 1917 No. 15

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EDITORIALS

Co-Operation and Education—A New Plumbing By-Law —Plumbing By-Laws Shelved—Out of Business Without Knowing it—Need for Caution.

The MacLean Publishing Co., Limited

JOHN BAYNE MACLEAN, *President* ESTABLISHED 1887 H. T. HUNTER, *Vice-President*
H. V. TYRRELL, *General Manager* T. B. COSTAIN, *Managing Editor*

SANITARY ENGINEER, PLUMBER and STEAMFITTER of CANADA

J. G. Lorriman, *Manager* Edwin Newsome, *Editor*
J. J. Butler, *Western Ontario Representative* Fred McLaughlin, *Eastern Ontario Representative*
H. M. Reid, *Montreal and Eastern Manager.*

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Cable Address Macpubco, Toronto; Atabek, London, England.

CHIEF OFFICES:

CANADA—Montreal, Southam Building, 128 Bleury Street; Toronto; 143-153 University Ave., Telephone Main 7324; Winnipeg, 1207 Union Trust Building.

GREAT BRITAIN—LONDON, The MacLean Company of Great Britain, Limited, 88 Fleet Street, E.C., E. J. Dodd, Director. Telephone Central 12960. Cable Address: Atabek, London, England.

UNITED STATES—New York, R. B. Huestis, 111 Broadway, N.Y., Telephone Rector 8971; Boston, C. L. Morton, Room, 733, Old South Building, Telephone Main 1204. A. H. Byrne, 1104-5-6-7 Fort Dearborn Bldg., 105 W. Monroe St., Chicago, Telephone Randolph 3234.

THE WATER-CLOSET TANK
THAT DOES NOT DETERIORATE



When we take into consideration the fact that until the VITRO NO-TROUBLE TANK was put on the market, there was not one tank that did not deteriorate to some extent when in use because of the action which natural laws brought to bear upon them, we must give credit where credit is due. We must be honest in our convictions and conclude that as the *Vitro No-Trouble Tank* has not shown any signs of deterioration, even after being in use for ten years, it must be the best tank on the market.

The very fact that there are several hundred thousand **Vitro Tanks** in use proves that it would be a very conservative statement to make if we said that over a million people are finding that the **Vitro No-trouble** tank is all that can be desired.

Build yourself a lasting reputation by installing the only W. C. tank on the market that has the trouble left out.

AGENCIES:

QUEBEC PROVINCE: Mechanics Supply Company, Limited, Quebec, Que.

MARITIME PROVINCES: The Jas. Robertson Company, Limited, St. John, N.B.

Cluff Manufacturing Company, Limited

81-111 Sterling Road, Toronto, Ontario

HANDLED BY EVERY JOBBER FROM COAST TO COAST

A Small, Neat and Well-Arranged Bathroom



WHERE space is limited, it is always desirable to procure neat fixtures. Fixtures that can be arranged so as to look well, give greatest amount of service with least inconvenience.

Port Hope Enamelware Fixtures are well designed, durable and lend themselves to such conditions as cannot be overcome through lack of space and do not look crowded.

The above bathroom is small, neat and well arranged, showing what can be accomplished when Port Hope Enamelware is installed.

Let your next order be for Port Hope Enamelware. Every jobber in Canada carries a stock from which they can make prompt shipment.

TORONTO SHOW ROOMS
119 King St. East

MONTREAL SHOWROOMS
234 Beaver Hall Hill

Port Hope Sanitary Mfg. Co., Limited

Factory:
PORT HOPE, ONTARIO

Head Office:
ROYAL BANK BUILDING, TORONTO

THE SANITARY ENGINEER

VOL. XI AUGUST 1, 1917 No. 15

Creating New Business

Giving a Few Instances of the Way Sanitary and Heating Engineers Go After and Create New Business—Some Novel Ideas, as Well as Practical Ones That Are Working Wonders.

IT would almost appear to be beneath the dignity of some saitary and heating engineers to advertise for work, just as in the Old Land, one never hears of a lawyer or doctor advertising for patronage. In fact, until very recent year, in the old established Old Country, even the manufacturer did very little advertising.

However, changes are taking place and there is an awakening coming, if it has not already come, to most business men, sanitary and heating engineers not excepted. It is a very common thing these days to hear the remark, "Well, it can't be much good; the manufacturer is afraid to advertise it," or "I make a practice of buying only those goods that are advertised because I know there is likely to be more behind an advertised article than behind those goods that are not."

These same arguments apply with the progressive sanitary and heating engineer. Wherever one finds a member of the craft who pays attention to his advertising, and conducts regular advertising campaigns in his district, one can rest assured that that man is conducting oftener than not, a successful business. He knows his ability to give good service, and he realizes that the public are ever in want of good, practical, efficient service.

We have mentioned the T. A. Cowan Company's business many times in the SANITARY ENGINEER, because we know what there is behind the organization. Nothing very complex, every department conducted upon simple yet efficient and economic lines. Just look well over the accompanying advertisement, and see if there is anything in it that every honest, practical man in the trade could not live up to, and we can vouch for the success of this business. There is no reason in the world why every member of the trade should not follow in the footsteps of our friend, T. A. Cowan. He started in a humble way, with much less capital than hundreds of our craft had, but with what exceptional results! One of the most progressive men in the trade. A business that has been built up slowly, but surely, upon lines that pleased the people of Brantford to such an extent that the T. A. Cowan business is a success; not merely a valuable asset for Mr. Cowan, but a success for Brantford.

You May Thank The Plumber

FOR EVERY SANITARY IMPROVEMENT



You are indebted to him many times a day for comforts and conveniences enjoyed by you and your family.

He is at your service any time to make repairs—no matter how disagreeable they may be—repairs that are worth to you many times the small charge levied by the average plumber.

He is not growing rich—on the contrary he has less of this world's goods than a lot of other business men, who, if they closed their doors tomorrow, you would not be inconvenienced in the least.



Our Plumbing Department is operated on up-to-date principles. Our stock is the largest in the city—our employees are specially trained—careful, conscientious mechanics, not "Jack-of-all-trades" nor "Handymen."

Cowan Service Costs You no More—May we serve You?

COWAN'S, 81 Colborne St.

"The Store With the Blue Front"

PLUMBING HEATING ELECTRIC

The above kind of advertising is pulling business. The City of Brantford is one of the cleanest and most up-to-date cities in Canada. Its industries are in the hands of clean, sharp business men, and the plumbers are on the whole looked upon as a body of respectable, honest citizens.

The advertisement shown above did not fill half a page. It was about 6½ x 9 inches. It speaks the truth and invites patronage from those only who want to be served well. It distinctly states that not one impractical man is engaged by the concern, which, we regret to have to say, is not the case with every firm in the trade.

Cheap labor always costs more, and it would not be so bad if only the employer suffered, but the public suffer, and so do also other members in the trade. Impractical men never could earn what the public expects to pay for. And, further, we must not forget that the people are becoming wiser every day; they are able to discriminate between a good and a poor mechanic. They are being educated to the fact that if one wants practical service one must be ready to pay for it.

It is thus up to every member of the trade to employ none but practical men, to advertise the fact and to live up to the advertisement to the letter.

NEW BOOK

"Sirocco Products" is the title of a splendid book being published and issued to the heating trade by The Canadian Sirocco Co. of Windsor, Ontario.

It describes this concern's products, is beautifully gotten up and contains some valuable imformation regarding sanitary heating and ventilation systems. There is no doubt about the fact that heating enginers will find in this book much data of use in their trade.

The Necessity of Sanitary Plumbing

This Article is Packed With Splendid Selling Arguments That Can be Used by Sanitary Engineers—Every Member of the Craft Needs to Use All Such Arguments When Trying to Make a Sale.

By W. C. Groeninger, State Inspector of Plumbing, Ohio State Board of Health.

SANITARY plumbing is the art of installing in buildings the pipes, fixtures and other apparatus used for introducing the water supply and removing liquid and water-carried wastes. It represents an art upon which all civilization depends and must be installed in accordance with scientific principles and natural law.

There is nothing in a building that adds more to the comfort and convenience of the occupant than does a simple, efficient and economical system of plumbing. Did you ever attempt to realize what would happen to your city if all buildings were deprived of a plumbing system. The thought of deprivation is terrible when you begin to think about the insanitary condition that would follow and the nuisances that would result, also the increased number of breeding places for flies, mosquitoes, rats and other well known carriers of communicable, contagious and infectious diseases.

The modern home, factory, school, theatre, office building, hospital, hotel and public institution of to-day, would not and cannot be successfully operated without a system of plumbing and drainage. The removal of infectious material from buildings is of value to public health. The mental and physical health of the occupants of a home is dependent in a great measure upon the sanitary conveniences. They are essential to the cleanliness of both the person and apparel. The cleanliness of the body is simplified by the bath tub and shower bath. The cleanliness of the apparel is simplified by the laundry trays. The cleanliness of the hands by which many diseases are transmitted to the mouth, is simplified by the lavatory. The sanitary condition of the kitchen and the cleanliness of cooking utensils and food is in a great measure dependent upon the kitchen sink. The sanitary drinking fountain has eliminated the danger inherent in the use of the common drinking cup, and the sanitary water closet is the safest method of removing human excrement and urine, which are the greatest hazard to man. The modern convenience has eliminated thousands of foul germ-producing privy vaults, the chief breeding place of that disease-carrying pest and menace, the common house fly. The elimination of the privy vault has also removed one of the homes of the rat, another pest which is a very expensive boarder and a known disease carrier.

The intelligent real estate dealer is aware that a system of plumbing increases the value of the building far beyond the actual cost of the plumbing system. The hotel manager is able to charge from fifty cents to a dollar a day more for a room with sanitary conveniences. Running water in hotels is now considered a necessary adjunct by the traveling public. The plumbing system in a hotel not only adds to the comfort, convenience and health of the patrons, but is a source of revenue, which brings large returns to the owner.

The housewife of this country owes a debt of gratitude to the plumbing business because of the progress and measures adopted to lighten the labor of house work. Cooking, washing and the removal of body and domestic wastes, formerly drudgery, are now simplified by sanitary conveniences. Formerly water had to be pumped or lifted and carried from the well, cistern or spring for drinking, cooking, laundry, bathing and other household purposes, and the wastes had to be carried and emptied. The water was often of questionable quality. The method and place of waste disposal in nine out of ten cases resulted in a nuisance. The back yard privy located at the greatest distance from the house to remove the possible odors in summer, added to the discomfort and inconvenience and the possibilities of added difficulties and irregularities in bad weather.

Go back thirty years or even twenty years and compare women's work then and to-day and it will be found that most of the drudgery existing has been eliminated by the plumbing system. Hot and cold water for drinking, bathing and domestic purposes is conveniently arranged for use in the laundry, kitchen, bath and bed rooms. Domestic and body wastes are swiftly and safely removed from the immediate premises by the drainage system. Labor has been reduced, comfort and conveniences added and personal cleanliness simplified. pure water supplied, foul odors, unhealthful conditions and the elements favorable to the origin and development of disease have been removed.

Low first cost in plumbing installation is mistaken economy. A second class plumbing and drainage system in cost will prove itself a second class system in service. A year or so in service will reveal the inefficiency of the fixture, device or construction. Discomfort, inconvenience, cost of repairs, foul odors, insanitary and unhealthful conditions are the resulting penalties, which the occupant must pay.

Sanitary plumbing is of more real value than medicine. Plumbing provides means for keeping the body, wearing apparel, the house and our streets and alleys clean. Cleanliness means healthfulness. A plumbing system stands for cleanliness, which also means that the plumbing system prevents where medicine cures, and prevention is more desirable than the cure.

Investigation has shown that in the absence of sanitary regulations and whenever each person is permitted to install a plumbing system according to his own ideas, insanitary conditions are sure to prevail. Shall the standard of plumbing regulations be determined by the person who lives in the house, by the owner, the manager, real estate speculator, material manufacturer, or in conformity with the standard of living and decency?

A great many people still cling to the idea that plumbing codes are created and laws enacted for the sole benefit of plumbers and that the public is made their legalized prey. This idea is kept in motion by real estate speculators, specialty and material manufacturers and others whose only interests are mercenary. No humanitarian, social, moral, financial or sanitary argument can be adduced against the enactment and the standardization of plumbing codes by state and nation. This will not only eliminate commercially interested individuals and corporations but any other organization whose interests are purely selfish.

To protect the public from insanitary plumbing and the influence of harmful surroundings caused by reckless competition, the use of cheap and defective material and improper installation, sanitary regulations are provided, regulating the location, construction, installation and inspection of plumbing.

INSPECTOR TO PROBE WATER POLLUTION

Dr. Bell, Medical Inspector of the Provincial Board of Health, has been sent to Point au Baril, Georgian Bay district, to make an investigation into complaints that certain owners of summer cottages there are permitting sewage to be deposited in the waters of the bay, thus endangering the health of other cottagers, who get their supply of drinking water from the Georgian Bay. Commenting on the above would suggest that sanitary engineers should note well the above and take care that they install sanitary sewage disposal systems when they equip a rural home with sanitary plumbing.

Whether your time is your own, or whether somebody else has paid for it, it represents a money value. Don't be a waster of time.

A Warning Note to Heating Engineers

Repair Work, as Well as New Heating Installations, Must be Executed According to the Ontario Boiler Act—Valuable Data for Heating Engineers Given.

WE HAVE learned from several sources that work is being done in connection with heating installation, and repair work that does not conform with the Ontario boiler act.

Some of the reasons why these repairs no doubt are being done, is to save buying new valves and fittings, etc., because of the high cost of such material, and the inability to procure supplies.

From what can be learned, it is against the law in Ontario at least to install heating boilers of any kind that are not of such a design and type as would not warrant a certificate attached thereto. This certificate is the only safe guarantee that the boiler is of approved type, and we would urge our readers not to install any boiler no matter where it is manufactured, that is not accompanied by such a certificate.

Furthermore, when re-fitting or making any repairs to existing heating plants, we would very strongly advise that the nature of the repair be reported to the chief inspector of Steam Boilers Public Works Department, Toronto, before doing the work.

For example any blow-off valves, safety valves, pressure gauges, etc., that have to be replaced must conform to the regulations embodied in the act.

For the benefit of our readers we are reprinting the following abstract:

"All steam boilers to be used in the Province of Ontario for heat and power purposes must be constructed from a design registered in the Steam Boiler Branch of the Department of Public Works, and must be accompanied by a certificate issued by the Department showing that the boiler has been built to conform with the Steam Boilers Act. Boilers used in a private residence, apartment house, office building, church, hotel or public building, used exclusively for heating purposes, are exempt provided that they are fitted with a safety valve which has been registered, limiting the pressure carried to fifteen pounds, and having an area figured in accordance with Section 107 of the Regulations."

Regarding boilers that are to be refitted with such mountings as come under this act, they can be identified by consulting the two accompanying tables which have been furnished by the Boiler Inspection Department referred to.

— DIAM'S OF SAFETY VALVES, HIGH PRESSURE —

SAFETY VALVE FORMULA — AREA = $\frac{37.5 \times \text{GRATE AREA}}{\text{MAX'M PRESSURE} + 15}$

GRATE AREA IN SQ. FT.	STEAM PRESSURE 50	65	75	85	100	115	125	135	150	165	175	185	200	GRATE AREA IN SQ. FT.
2	1¼"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	2
3	1½"	1¼"	1¼"	1¼"	1"	1"	1"	1"	1"	1"	1"	1"	1"	3
4	1½"	1½"	1½"	1¼"	1¼"	1¼"	1"	1"	1"	1"	1"	1"	1"	4
5	2"	1½"	1½"	1½"	1½"	1¼"	1¼"	1¼"	1¼"	1"	1"	1"	1"	5
6	2"	2"	1½"	1½	1½"	1½"	1½"	1¼"	1¼"	1¼"	1¼"	1¼"	1¼"	6
7	2"	2"	2"	1½	1½"	1½"	1½"	1½"	1½"	1¼"	1¼"	1¼"	1¼"	7
8	2½"	2"	2"	2"	2"	1½"	1½"	1½"	1½"	1½"	1½"	1¼"	1¼"	8
9	2½"	2"	2"	2"	2"	2"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	9
10	3"	2½"	2"	2"	2"	2"	2"	1½"	1½"	1½	1½"	1½"	1½"	10
12	3"	2½"	2½"	2½"	2"	2"	2"	2"	2"	2"	1½"	1½"	1½"	12
14	3"	3"	2½"	2½"	2½"	2"	2"	2"	2"	2"	2"	1½"	1½"	14
16	2-2½"	3"	3"	3"	2½"	2½"	2"	2"	2"	2"	2"	2"	2"	16
18	2-2½"	3"	3"	3"	2½"	2½"	2½"	2½"	2"	2"	2"	2"	2"	18
20	2-2½"	2-2½"	3"	3"	3"	2½"	2½"	2½"	2½"	2½"	2"	2"	2"	20
24	2-3"	2-3"	2-2½"	2-2½"	3"	3"	3"	3"	2½"	2½"	2½"	2½"	2½"	24
28	2-3"	2-3"	2-2½"	2-2½"	2-2½"	3"	3"	3"	3"	2½"	2½"	2½"	2½"	28
32	3-3"	2-3"	2-3"	2-2½"	2-2½"	2-2½"	3"	3"	3"	3"	3"	2½"	2½"	32
36	3-3"	2-3"	2-3"	2-3"	2-2½"	2-2½"	2-2½"	2-2½"	3"	3"	3"	3"	3"	36

By Courtesy of D. M. Medcalf, Chief Boiler Inspector, Public Works Department, Toronto.

BOILER SERVICE MAINTENANCE

A BOILER is in a dangerous condition when the plates, bolts, braces or rivets of which it is constructed become weakened to such an extent that the internal force or pressure equals the tensile strength of the material at the weakest section or sections. In this condition, strains due to varying temperature will cause rupture and an explosion, the volume and destructiveness of which would be in accordance with the size of the boiler and the pressure carried therein.

The moment a boiler is placed in service it gradually becomes weaker, due to the destroying forces continually acting upon it. These forces are of both a chemical and mechanical nature. Corrosion and oxidation are continually acting on the material from which a boiler is constructed, and take place both internally and externally, these processes being the two most serious and subtle causes of weakening to which a boiler is subjected. Evidences of these are most noticeable in the grooving and pitting of plate, and more especially at locations most subject to deposits of mud, scale and organic substances.

Expansion and contraction also play a very important part in the destruction and weakening of a boiler, more especially when concentrated at any one point, such as at sharp bends or flanges in the plates where the inner and outer sheets are subjected to different temperatures. Constant working or bending of bolts, flanges or angles, however, slight, will sooner or later destroy the fibres in the material at points subjected to it, causing crystalization, cracking, and leaving same more susceptible to the chemical action of the feed water.

It is therefore obvious that only thorough examination by competent inspectors who understand the construction, nature of defects, and remedies to be applied, will maintain a steam boiler in safe working condition.

— AREAS OF LOW-PRESSURE SAFETY VALVES —

— MAXIMUM STEAM PRESSURE — 15 LBS —

GRATE AREA	SIZE OF VALVE	GRATE AREA	SIZE OF VALVE
2 SQ FT	1¼" DIA	16	3½"
2·5	1¼"	17	3½"
3·0	1½"	18	3½"
3·5	1½"	19	4"
4·0	1½"	20	4"
4·5	2"	21	4"
5·0	2"	22	4"
5·5	2"	23	2-3"
6·0	2"	24	2-3"
6·5	2"	25	2-3"
7·0	2½"	26	2-3"
7·5	2½"	27	2-3"
8·0	2½"	28	2-3"
8·5	2½"	29	2-3"
9·0	2½"	30	2-3½"
9·5	2½"	31	2-3½"
10·0	3"	32	2-3½"
10·5	3"	33	2-3½"
11·0	3"	34	2-3½"
11·5	3"	35	2-3½"
12·0	3"	36	2-3½"
12·5	3"	37	2-4"
13·0	3"	38	2-4"
13·5	3"	39	2-4"
14·0	3"	40	2-4"
14·5	3"	41	2-4"
15·0	3½"	42	2-4"

By Courtesy of D. M. Medcalf, Chief Boiler Inspector, Public Works Department, Toronto.

APPOINTED TORONTO REPRESENTATIVE

G. F. Frankland, 22 College St., Toronto, has been appointed district representative for the Henderson Business Service Co., of Brantford.

Main House Trap and Breather Problem

No Subject Has Proved More Interesting Than That of the Main House Trap and Breather—We Publish Herewith a Few of the Many Replies We Have Received in Answer to a Number of Letters Recently Sent Out.

SEWER gas or, more correctly, sewer air has long enjoyed a particularly evil reputation not only on account of its somewhat objectionable odor, but because of the peculiarly malignant qualities with which it was believed to be endowed. It was supposed to be an active agent in the creation and spread of many diseases, *e.g.*, typhoid fever and diphtheria, and rapidly assumed the status of a "bogie" which, however, like all bogies turns out upon closer examination to be more or less of a myth. In consequence, however, of this belief people, individually and collectively, became active hysterically active in some cases, to beat back this menace to health and life and confine it to the sewer where it belonged. Sewer gas had to be kept out of the house at all times at any cost and much trouble and money was expended and much ingenuity exercised in the endeavor.

To this activity is, no doubt, due much of the immense advance in sanitary science and plumbing practice of recent years but in one point, at least, this zeal has been mis-directed and that is in the use, or perhaps I should say, the retention in use of the intercepting or main house-trap. In the opinion of a large and ever-increasing body of sanitarians, an opinion which is backed by experience, this trap, whatever raison d'etre it may have had in the days when defective was the rule rather than the exception, is now merely a "survival" not only useless but a positive nuisance, in that it tends to create those very conditions it was designed to guard against.

Sewer air may be a danger in one or both of two ways:—

1st. By the dissemination of pathegenic organisms.

2nd. By the effects of poisonous gases it may contain, such as sulphuretted hydrogen or carbon dioxide, producing a debilitating effect on those breathing them and thus pre-disposing to diseases transmitted in other ways.

As to the first, bacteriological researches have shown that disease or other germs are not given off to the air from the surface of liquid sewage or moist surfaces. The experiments of Major Horrocks of the Army Medical Corps, made at Gibraltar and recently communicated to the Royal Society, which seem to support a contrary opinion merely show that germs may be communicated to the air by splashing of the liquid; by dessication, or by the bursting of bubbles of C^{02} after decomposition has set in. The effect from splashing is merely local and momentary; dessication is improbable, certainly not normal in sewers, and decomposition should not exist to any appreciable extent in a well-constructed sewer, well flushed and ventilated; a desideratum in any sewage system. In this connection I would draw attention to the work of Prof. Winslow of Boston as embodied in his reports.

As to the second case, that of the possible effects of poisonous gases given off by sewage, it has been shown that these gases are only given off when decomposition sets in. Such gases can only be deleterious when they exist in quantity, and consequently, dilution and dispersal by thorough and ample ventilation would effectively dispose of them.

On the whole, it would seem that the chances of infection from the emanations from any well constructed, well flushed and thoroughly ventilated sewer are very remote. Actual tests have shown that bacteria are much less numerous in the air of sewers than in that taken in the streets, no doubt owing to the presence in these latter of dust consisting of dessicated horse-dung and other organic matter. It is now, I believe, generally conceded that the carriage of pathegenic organisms and consequent infection occurs by actual contact; transmission by insects; e.g. the house-fly by domestic or other animals or by consumption of infected milk or water.

It would therefore appear that sewers will be foul and the emanations therefrom harmful in an inverse ratio to the

EDITOR'S NOTE

This article is one of the replies received from a reader in Vancouver, B.C., one who has evidently given the problem a lot of thought and put such experiences as related into practice. Readers of The Sanitary Engineer will no doubt appreciate such a splendid reply.

WHAT IS YOUR OPINION ?

Deer Sir--

For a number of years the question of using a main house trap and breather on each private branch drain from a dwelling or building, between a house drain and ths main sewer, has been under consideration. Many favor the main house trap and breather, while some favor dispensing with both.

The following are a number of questions relating to the subject, enswers to which will be greatly appreciated, and if time will permit, a rough sketch will also be welcomed.

1. Are you in favor of the use of a main house trap and breather ? If so, why ? .....

2. Are you in favor of dispensing with the main house trap and breather ? If so, why ? .....

3. What is the law regarding above subject in your locality ? .....

Signed.....

Address.....

efficiency of the ventilation thereof. The necessity for such ventilation has long been recognized but the attempts to bring it about have not been conspicuously successful. One very general plan was to have manholes here and there in the streets having perforated covers. These did not ventilate and were, in fact, nothing but centres for the dissemination of foul odors and gases forced out into the streets by the increasing pressure in the sewer or by the movement of fluids therein. Ventilating shaft with or without induced draft have been used, these, however, did not act on the branch sewers and laterals. Getting nearer to a perfect system, it has been advocated and, I understand, is the practice, to some extent in England, to have a vent stack run up to the highest point of the building from the sewer side of the intercepting trap, thus ventilating the branch drain. Were this done on every sewer connection it is clear we should have, so far as the sewer system was concerned, a perfect system of ventilation but it is costly in labor and material; possibly unsightly; an added complexity and, as we think, unnecessary. Undue complexity is a serious defect in any sanitary system and unnecessary expense, however desirable it may appear to those who would profit by it, is not only an imposition on the public but actually discourages business and lays the trade open to all the evils which flow from parasitism.

Why not eliminate the intercepting trap with all its accessories and allow of free ventilation by means of the soil-stack to the upper air? In this way we have the most perfect system of ventilation possible, every branch drain and sewer connection is thoroughly and effectively ventilated; the nascent gases are immediately diluted and dispersed in the upper air in the most simple manner and at a considerable saving in labor and material. There are those who go farther than this and claim that the sewers under this system act as filters for the street air, which, passing through the thousands of soil-stacks, is freed from such pathegenic organisms it may already hold in suspension. This, then is the main objection to the house-trap not only in that it makes of the branch sewer a "dead end" in which sewer gases may be generated and confined but that the house system is very often inperfectly ventilated. The fresh air inlet necessary where it is used is in very many cases, in some parts a majority of cases, entirely inoperative being liable to stoppage with snow, soil, rubbish or other matter owing to the positions in which it is usually and almost unavoidably placed.

There are, however, other objections to the house-trap. It forms an obstruction to the free passage of sewage in the drain and is a very fruitful source of stoppages, some authorities ascribing as high as 80 per cent. of stoppage to this cause. It also prevents proper flushing of the drain and may retain organic matter subject to decomposition. It has often been found that the air in the house-drain is denser and more foul than that in the sewer, no doubt owing to this cause.

To anticipate objections I would observe that it will not do to argue that because you have foul sewer gases with the house-trap, that if it is removed that these gases will have free access to houses or may possibly be a danger to higher buildings as, by the elimination of the trap, you have brought into being an entirely new condition of affairs in which those gases are not allowed to accumulate, are diluted and rendered entirely innocuous. This is proved by experience. Then, again, it is argued; suppose there are defects in the house plumbing then the sewer air has direct access. Now, these defects would be a danger in any case but we hold that, not only has the sewer air been rendered comparatively harmless, but that the steady updraft in the soil-stack would tend to draw it away from much defective parts and discharge it at the roof outlet.

The house-trap, in short, is nothing but an unmitigated nuisance which does not even qualify as a necessary evil and to those of us who have not been habituated to it this whole controversy looks very much like flogging a dead horse.

To any one who is really open to conviction and is anxious to study the question a perusal of the report of the Royal Commission appointed by the British Government to enquire into the "intercepting trap" will prove a liberal education.

LATE VICE-PRESIDENT OF AMERICAN RADIATOR CO. LEAVES MILLIONS TO HIS EMPLOYEES

Appreciation for faithful services of 400 of his older employes by dividing $1,000,000 among them with further provisions giving them 60 per cent. of the income on $2.500,000, this principal also ultimately to be distributed among them with certain limitations, was expressed in the will of John Bartlett Pierce, of Peabody. Mass., vice-president of the American Radiator Company, who died June 23. Mr. Pierce's will was filed for probate in Salem. Not one of the beneficiary employes had the slightest intimation of the contents of the document until after the testator's death.

Mr. Pierce, who was founder of the radiator business in the United States, left an estate estimated at $5,000,000.

In addition to the million dollars to be distributed at once among the employes, Mr. Pierce left one million outright to his widow and $500,000 in various bequests to relatives and friends. The residuary estate of $2.500,000 is left in trust, 40 per cent. of the income to go to the widow and two half-sisters, and 60 per cent. to be distributed among the employes in the same ratio as the million dollar bequest. After the deaths of the widow and sisters the principal of the trust fund is to be distributed among the employes. Such an act of kindness to one's late employees is well worthy of comment. It proves that the spirit of brotherhood is being put into actual practice more every day, and that when such a person as Mr. Pierce does pass on in the flesh, his spirit will still go on and bear fruit. Such actions are sounding the death knell to the selfish capitalistic exploitor.—Editor.

TENDERS

Halifax, N.S.—Works Department, City Council, will construct a $12,000 sewer extension. Engineer, H. W. Johnston.

Caradoc Township, Ont.—Tenders received by the secretary-treasurer, John Brodie, Mount Brydges, until August 6 for drainage work for the Township Council.

Vancouver, B.C.—Plans are being prepared for a $35,000 sewer for the Vancouver and Districts Joint Sewerage and Drainage Board, City Hall. Engineer, A. D. Creer.

Dorval, Que.—Tenders are being received by the engineers, Dupont, Roy & Baudouin, 225 St. James St., Montreal, for the erecting of a filtration plant for the City Council.

Toronto, Ont.—Tenders close August 14 for extension of Rosedale Creek Sewer from High Level pumping station to Russell Hill Road and Clarendon Ave. Secretary, Thos. McQueen.

CONTRACT AWARDED

Oil Springs, Ont.—The Oil Springs Tile Company have the contract for a 10-inch tile drain for the Town Council.

Stratford. Ont.—J. R. Myers & Sons, have plumbing and heating contracts for $20.000 addition to Central Methodist Church.

St. Johns, Que.—City Council have awarded the contract for the construction of filter, tank and the improvements to the city waterworks to Laurin & Leitch, Montreal, for the sum of $195,975.

NEW FILTRATION PLANT

Woodstock, N.B.—A by-law will be submitted to the ratepayers on Aug. 10 to authorize the installation of a mechanical filtration plant.

CONCRETE SEWER PIPE

The Council of the city of Los Angeles, Cal., has just adopted specifications for the construction of sanitary sewers within the city which permit the use of concrete sewer pipe.

TENDERS

Dorval, Que.—Tenders will be received until July 31, for the construction of a filtration plant for the Town of Dorval, Que. Plans and specifications may be seen at the office of Dupont, Roy & Beaudoin, engineers, 225 St. James, Montreal.

New Toronto Plumbing By-law No. 131

This By-law is One of the Latest to Come to Our Notice—It Will Prove a Boon to This New Town and go a Long Way Towards Eliminating Many of the Evils Which Older Cities and Towns Are Heir to.

THE following by-law will be of no small amount of interest to every member of the trade, it is the latest to be put into force. The accompanying tables are facsmiles of the forms to be filled in before a permit is granted to install any plumbing construction in that municpality.

Plumbing and Drains for Buildings

The Council of the Village of New Toronto enacts as follows:

1. It shall be unlawful for any person or persons to do any work in connection with plumbing or drainage of any building within the Village of New Toronto, unless the same shall conform with the following requirements

Permits for Construction of Drainage and Plumbing

2. Before proceeding to construct, reconstruct, alter or relay any portion of the drainage, ventilation or water system of any hotel, warehouse, dwelling house, or other building, the owner or his agent (in the case of the agent his authority from the owner must be produced in writing) desiring to construct the same shall file in the office of the Clerk an application for a permit therefor, and such application shall be accompanied with a specification, or abstract thereof, in a blank form prescribed and supplied for this purpose, stating the nature of the work to be done and giving the size, kind and weight of all pipes, and fittings, and a description of all closets and other fixtures.

Refusal of Permits When Plans Do Not Conform With Requirements

3. If the Engineer finds that the specifications, or abstract, do not conform with this by-law, he shall not issue any permit, and it shall be unlawful to proceed with the work referred to in the application.

Granting Permits

4. A permit shall be granted or refused within two days from the time of filing the application, and (if granted) shall be valid for six months from the date of issue.

Alteration of Specification

5. After a specification has once been approved, no alteration or deviation from the same shall be allowed, except on a written application of the owner, or agent of the owner, and with the approval of the Engineer.

Plumber, Etc., Not to Do Work Until Permit Obtained

6. No master plumber, plumber or tile drain layer, engaged by the owner of any building to construct, reconstruct, alter or relay any portion of the drainage, ventilation or water system thereof, shall do any work in connection with such construction, reconstruction, alteration or relaying at or upon any such building until such master plumber, plumber, or tile drain layer has satisfied himself that the owner has filed his application for a permit for such work, as required by section 2 of this by-law, and the production of such permit from the Engineer shall be sufficient evidence to the said master plumber, plumber, or tile drain layer, of the application having been properly made.

Hand-Hole Cleaning Trap

7. Between the building and the public sewer or drain there shall be placed a ventilation hand-hole cleaning trap of approved description and make.

Air Inlet Pipe

8. Between the said trap and the foot of the soil pipe there shall be connected with main house drain an inlet pipe for the admission of fresh air, four inches in diameter, to be situated at least 10 feet, if possible, from any opening into the house, and not less than 12 inches above finished grade, the mouth of which shall have a return bend, or a cap, giving an area of one-fourth more than the diameter of the inlet pipe said air inlet to have at least four feet of cast iron pipe attached to it, and be supplied and placed in position by person putting in drain to which it is attached.

Septic Tanks

9. In case of a building, or buildings, to be built on a street which is not sewered, septic tanks may be installed upon receiving a special permit from the Engineer, and they shall be subject to conditions imposed by him from time to time.

Tile Pipes Underground

10. Tile pipe in underground drainage shall be of the best material and workmanship, and free from all blisters, cracks, flaws, or defects of any description.

Junctions—Joints Cemented

11. All changes in direction shall be made with "Y" junctions and curved bends; no right angle junctions will be allowed; all joints must be put together with the best Portland cement, properly mixed and tempered and finished flush with the edge of the pipe; the joints on the inside of the drain to be in all cases properly cleaned and finished so as to be perfectly free from all burrs; drain shall have a fall of not less than one-quarter of an inch to the foot.

Tile Drain Pipes—Surface or Weeping Drains

12. Vitrified salt glazed earthenware drain pipes shall be equal in quality to those used for the private drain connections, as specified from time to time by the Engineer for private drain connections. The pipe used for weeping, or sub-soil, drainage tiles shall be connected to a rain water leader drain on house side of trap; surface and floor drains must be trapped and have a rain water leader discharging through the trap used for same.

Must Connect on House Side of Main Trap

13. All drains used for weeping and sub-soil drainage of any building must connect to main drain of building on house side of main trap, and be so arranged that sewage will not pass or back into their trap.

Prepared Foundation—No Built Traps or Mason's Traps—Cleaning Traps Inverted Joints

14. All earthenware drains laid on newly made ground, or very wet soil, shall be laid on a prepared foundation of concrete. No built trap or mason's trap shall be used inside of any building. All traps on earthenware drains shall be of vitrified salt glazed eathenware, and all traps to have handholes, and said handholes extended to the surface. No inverted joints of any kind will be allowed below any fixture.

Private Drains Laid By the Corporation

15. All private drains laid by the Corporation are to be taken to the outside of the wall where buildings are on the street line, and only two (2) buildings will be allowed to connect with any six-inch private drain, except as provided for in clause No. 26 of this by-law.

Rain Water Leaders

16. All rain water leaders shall be trapped when connected with the drainage system of any building.

All Drains of Cast-Iron or Tile Pipes

17. All drains used for sewage, or waste water, under any building, shall be of cast iron, or vitrified salt glazed earthenware drain pipe, and of the kind and weight specified by this by-law.

Cleaning Out Screws on All Cast-Iron Drains

18. All cast iron drains, when ten feet or longer, shall have at least two cleaning-out screws, or approved hand-hole fittings, one to be about twelve inches above and in front of the bend at the basement floor, that is, one on each vertical soil pipe, or waste pipe, and the other between the said bend and the outer wall of the house; in all other cases, one clean-out screw, or hand-hole fitting described, will be sufficient.

Cleaning Out Screws

19. Clean-out screws, or air-tight hand-hole fittings shall be of the same size as the pipe to which they are attached, except when pipe is larger than 4 inches, when 4 inches will suffice.

Alterations in a Building

20. When alterations are made in a building, already drained by a tile drain, same may be re-used, provided they are satisfactory to the Engineer.

Fixtures Trapped and Connected

21. All plumbing fixtures put in for use in any building shall be properly trapped, vented and connected to a sewage drain, soil or waste pipe.

Refrigerator Wastes

22. Refrigerator wastes, if drained, shall terminate and discharge either into an open sink, which is supplied with village water, or an opening used for drainage of cellar floor surface.

Safe Waste, Etc., Not to Connect With Drain

23. No safe waste, range boiler, heating boiler, vacuum cleaner or cistern overflow shall be allowed to connect direct with any drain.

Drinking Fountains

24. Drinking fountains, manufactured for this purpose only, placed on wall or pedestal, and used for drinking only, may be connected to a rain water leader drain on building side of its trap without having a separate trap and vent; but if connected to a sewage drain they will be considered a plumbing fixture, and shall have a trap properly vented.

Building to Have Separate Soil Pipes and Drains—Two Buildings on the Lot, One in Rear.

25. Each house or building must have its own separate soil pipe, four inches or larger, and drain, and such soil pipe shall be so placed as to enable it to be readily inspected without destruction to walls; and the plumber shall be responsible for the proper connection of his work with the system of drainage; and no two or more buildings shall have any drain in common until each separate drain shall have passed outside the walls of the house or building which it serves, except when there are two buildings on the one lot, one in rear of the other, if in that case there is no sewer or drain in the lane or alley to which the rear building can connect, and the rear building is not used as a dwelling house, or for human habitation, the drain of the front building may be extended to serve such rear building.

Two Buildings Flush With the Line of the Street—Archway Over Drains —Taper Pipe.

26. Where buildings are connected flush with the line of the street, two buildings may be connected with one six-inch pipe or larger street drain, with a "Y" junction, placed immediately in front of the wall, provided an archway is thrown over the same to protect both drains and wall of building. All drains

TOWN OF NEW TORONTO

DEPARTMENT OF PUBLIC HEALTH

PLUMBING AND DRAINAGE DIVISION

APPLICATION is hereby made to the Town Clerk, for permission to construct, re-construct, alter or relay the PLUMBING and DRAINAGE work.....

at premises located at No.....St., Av.

being on the.....side of said street, or.....ft.....of.....St., Av.

between.....St., Av., and.....St., Av.

Owner ..... Address.....St., Av.

Architect ..... Address.....St., Av.

Plumber ..... Address.....St., Av.

Drain Layer ..... Address.....St., Av.

No. of Buildings.....What used for?.....

Pursuant to the provisions of By-Law No. 131 of the Town of New Toronto, the owner by himself or through his duly authorized agent, hereby agrees to cause the work to be done, and the material to be furnished in conformity therewith, and in a workmanlike manner, under the inspection of the Engineer or his Inspector

No modification of the specification, or of the work described therein, shall be made unless the same is previously allowed by the Engineer.

PLUMBING WORK

The plumber shall furnish all materials and perform all labor requisite and necessary for putting up and completing all the plumbing work, in a good and thoroughly workmanlike manner, according to the provisions of the By-law.

The plumber or drain layer to send written notice to the Town Clerk, when their respective work is ready for inspection, and all work is to be left uncovered until inspected, tested and approved of. **And after the work has been completed it will be submitted for smoke testing before being finally passed.**

To prevent the discharge of steam, hot water or oil, tar and grease into the sewers.

"No person shall damage or injure any common sewer or private drain, or sewer communicating therewith, and no person shall cause or permit the discharge of steam or hot water above a temperature of 150 degrees Fahrenheit from any engine or boiler, or oil, tar and grease, into any common sewer or private drain, or sewer communicating therewith."

DRAINAGE.

1. TILE PIPES to be of the best material and workmanship; manufactured from clay approved of by the Engineer; the pipes to be perfectly salt glazed, well burnt, non-porous and perfectly sound, truly circular, and of full diameter throughout; free from all blisters, cracks, flaws or defects of any description. Each pipe to be not less than two feet in length, with whole sockets. The pipes to be of such depth of socket and thickness as the Engineer may direct.

2. All junctions to be curved; no right angle junctions to be used.

3. The joints to be put together with the best fresh Portland Cement, properly mixed and tempered.

4. The trench to be excavated to the bottom at least one foot wider than the diameter of the pipe. The whole length of the trench to be excavated to the proper depth before any pipes are laid. The bottom of the trench to be hollowed out to the correct form and size of the pipe, and to be indented at the sockets so as to admit of the surface of the pipes having an even bearing throughout. The material excavated shall be piled compactly at the side of the trench, and where the ground is newly made, or soil very wet, the drain to be laid on a prepared foundation of plank and concrete, as may be required by the Engineer.

5. Before the drain is covered, written notice shall be sent to the Town Clerk by the owner or drain layer, that the Engineer or Inspector may examine the work; it being understood that the Engineer will not approve of a drain which has not been examined and tested and found to be properly constructed and tight.

6. When called for by the Engineer or Inspector the applicant to stop up all openings in the drain and fill it up to the highest point with water, allowing it to stand full, and any defects which may be discovered to be made satisfactory within two days after notice has been given of the same.

7. Between the said trap and the foot of the soil pipe there shall be connected with main house drain an inlet pipe for the admission of fresh air, four inches in diameter, to be situated at least 10 feet, if possible, from any opening into the house, and not less than 12 inches above finished grade, the mouth of which shall have a return bend or a cap giving an area of one-fourth more than the diameter of the inlet pipe; said air inlet to have at least four feet of cast iron pipe attached to it, and be supplied and placed in position by person putting in drain, to which it is attached.

SIGNATURE OF OWNER

This must be the genuine signature of the owner, or if represented by an agent, the owner's written authority must be produced.

Dated this.....day of.....19

The above Application complies with the requirements of By-law No. 131, and I recommend that a permit be granted.

.....

ENGINEER

must be properly connected with the private drain and not covered until inspected. In no case shall the drains between the walls of the house and the street line be laid until the private drain from the street line to the public sewer shall first have been laid and completed. Where the tile and iron pipes are not of the same size, the iron pipe must be connected to the tile drain by a taper pipe.

All Soil Pipes of Cast Iron Wrought Iron Galvanized—Flashed With Five Pound Sheet Lead.

27. All soil pipes within the walls of any building shall be of cast iron galvanized, and shall be continued at least three feet above any opening in the roof, which may be within fifteen feet of the same, and three feet above any opening into any adjoining building, or extension, when such building, or extension, is within fifteen feet of such pipe, and be left open so that the whole of the inside drainage may be thoroughly and constantly ventilated. All soil or vent pipes, when they pass through the roof, must be properly flashed with five pound sheet lead or 18 gauge copper, and made water tight. That portion of metal resting on roof must be at least 20 inches square, and that portion extending up pipe, if used, must be 10 inches high.

Soil Pipes Must Be Increased One Size

28. No soil pipe of 4 inches in size shall receive or have connected to it the discharge of more than four floors of any apartments or flats, building; each floor must not contain more than two W.C.s, four baths, two basins, two sinks, and two sets of laundry tubs. Main vent pipe for this or similar cases must be increased one size below roof, and pass out separately through roof.

Cast Iron Pipes

29. No cast iron pipe used for soil pipe shall weigh less than the following per length of five feet:

2 inch inside diameter ..... 20 lbs.
3 inch inside diameter ..... 30 lbs.
4 inch inside diameter ..... 45 lbs.
5 inch inside diameter ..... 85 lbs.
6 inch inside diameter .....100 lbs.

Cast Iron Drains—Pipes, Traps, Bends, Fittings of Good Quality.

30. No cast iron pipe used for drains under ground shall weigh less than the following, per length of five feet, and must be coated with asphaltum or tar supplied hot, together with all fittings in drain under ground.

2 inch diameter inside ..... 27½ lbs.
3 inch inside diameter ..... 47½ lbs.
4 inch inside diameter ..... 65 lbs.
5 inch inside diameter ..... 85 lbs.
6 inch inside diameter .....100 lbs.

And all pipes, traps, bends or fittings of cast iron shall be of good quality, and shall be free from flaws or defects, and shall be of uniform thickness; untarred pipe and fittings only to be used above ground, which shall be immersed in linseed or other vegetable oil, or other coating which the Engineer from time to time may approve of to prevent them from rusting.

Number, Location and Description of Fixtures, with Size of Trap and Vent Pipes.

	Basement	Ground Floor	1st Floor	2nd Floor	3rd Floor	4th Floor	Diameter of Vent	Diameter of Trap	Material
Water Closets									
Kitchen Sinks									
Slop Sinks									
Other Sinks									
Bath Tubs									
Wash Basins									
Wash Tubs									
Other Boilers									
Lawn Hydrants									
Urinals									
Other Fixtures									

All the material shall be of good quality, free from defects, and of the standard size and weights described in the By-law, viz.:

FOR CAST IRON PIPES			FOR LEAD PIPE			FOR WROUGHT IRON GALVANIZED PIPE		
Dia. in in.	Wght. per length of 5 feet	Purpose for which it is to be used	Dia. in in.	Weight per yard	Purpose for which it is to be used	Inside Dia. in in.	Weigh per lineal foot	Purpose for which it is to be used
			⅜	4 lbs.		1¼	2.24	
			½	6 lbs.		1½	2.68	
			⅝	8 lbs.		2	3.61	
			¾	10 lbs.		2½	5.74	
6	100. lbs.		1	13 lbs.		3	7.54	
5	85 lbs.		1¼	7 lbs.		3½	9.00	
4	65 lbs.		1½	8 lbs.		4	10.66	
4	45 lbs.		2	10½ lbs.		4½	12.34	
3	47½ lbs.		2½	13½ lbs.		5		
3	30 lbs.		3	16½ lbs.		5	14.50	
2	27½ lbs.		4	24 lbs.		6	18.76	
2	20 lbs.							

DESCRIPTION OF FIXTURES TO BE USED.

Water Closet .....
Sink .....
Bath .....
Basin .....
Wash Tubs .....
Urinal .....
Other Fixtures .....

Traps and Fttings to Be Same Quality As Pipe

31. All traps and fittings shall be equal in quality and thickness to the pipe to which they are attached.

Galvanized Wrought Iron Pipe

32. No wrought iron pipe galvanized shall weigh less than the following per lineal foot:

1¼ inches inside diameter 2.24 lbs. per lineal foot.
1½ inches inside diameter 2.68 lbs. per lineal foot.
2 inches inside diameter 3.61 lbs. per lineal foot.
2½ inches inside diameter 5.74 lbs. per lineal foot.
3 inches inside diameter 7.54 lbs. per lineal foot.
3½ inches inside diameter 9.00 lbs. per lineal foot.
4 inches inside diameter 10.66 lbs. per lineal foot.
4½ inches inside diameter 12.34 lbs. per lineal foot.
5 inches inside diameter 14.50 lbs. per lineal foot.
6 inches inside diameter 18.76 lbs. per lineal foot.

(Continued in Next Issue.)

Be a Merchant

Showing How Overhead Expenses May be Kept Down by Selling Goods to the Householder That Would be Sold and is Being Sold by Hardware Merchants— Some Cases That Have Convinced Men Who Until Recently Insisted Upon Running a Workshop Only, That to be a Merchant is Better.

"I WAS very much taken up with that article you had in the SANITARY ENGINEER last week, in which you told of a Mr. Parrish selling plumbing goods and doing a fine business in a small town, etc." Thus spoke a reader of the SANITARY ENGINEER to the Editor a few days ago, and the result is that we are able to tell a little of what happened to our interested reader. Said he, "Do you know that for over 25 years my old Dad ran a shop and hired as many as 15 men at a time, but he did not believe in the merchant idea. No, he would stick to the shop, and many times when I said we ought to buy heavier and run a store, he would "raise Cain" and reply that he might as well be a hardware merchant, etc. Well, I would sometimes say, how is it that Mr. Jones started a hardware store, knew nothing about plumbing and finally hired a man to connect stoves and ranges. Then get an odd job at putting in a new range boiler, and so on until now that same fellow hires between 15 and 20 practical men and has a foreman. That was before the war. Jones is as bad off as we are for men, but he's a darn sight busier than we are, too. He has a stenographer and bookkeeper, and a girl who demonstrates gas stoves. I went in the other day and that same girl was just upon making a sale for an electric stove. She was 'some girl,' Mr. Editor, it would have done your heart good to hear how she was handling that woman, showing her how to save electric current, etc. Then I remembered how that I was kept up at nights figuring up our cost, sending out tenders and all to no purpose, but I'm through with all that. As you see, I have started the merchant idea.

Here the door opened and in walked a lady. "Mr. A., I've just called in to pay this bill. Mr. Brown left it on the sideboard this morning and I know he intended to call and pay it, besides, we want some electric bulbs, and he was to get some from you when he called to pay the bill."

I listened to the conversation which ended in the lady buying $2.95 worth of bulbs and paying $11.40. Just as the lady was leaving, in walked her husband and after exchanging a few words she said, "I just noticed that Mr. A. has some splendid portable electric lamps that are fitted to an ordinary battery. Such a lamp would be mighty handy when we go down to the garage instead of having it wired. I don't think we can afford to have it wired and I certainly don't like that old coal oil lantern you use." Just imagine what would happen if it got knocked over, and all that gasoline about.

One of the electric lamps and battery combinations was bought, and as the man and his wife were looking round they noticed a new kind of electric bulb, with mirror tops. Nearly $7.00 more was spent in that store all in as short a period as it took to tell this story.

There was nearly $10.00 of cash sales, and an account paid amounting to $11.40, all because of it being possible to procure a few lamps at a plumber merchant's store.

But before the writer had time to comment upon the above business transactions, in walked another gentleman, asked the price of a range boiler, the price quoted was $16.40. "Whew! My but you plumbers do know how to charge. I called in the ——— departmental store and they only asked $13.00. How do you make that out?"

Here was a little more real salesmanship put into effect. Our plumber said, "Well, I suppose the boiler is fully guaranteed. I suppose if it leaks in a week or two, or even a month or two for that matter, you will be able to get a new one for it? Further, if it does leak, who will pay for taking your $13.00 boiler out and replacing it with a new one, even if they do give you a new one? Do you think your departmental store friends will bear all the cost, etc." "I never thought of those things happening, but I suppose there is some chance of there being trouble," replied the gentleman. "Further," replied our plumber friend, "I am looking for your business. When you spend money with me I must see to it that you are pleased, because $50 worth of business is of far greater value to me than to our departmental store folk. They would never miss your small item of trade.

"Another thing, if the boiler does not give good service, and I have sold it to you, I guarantee it for at least a year. I install it at as moderate a charge as anyone else, and I bear the cost of changing it if it gives trouble. In fact, you take no risk, and I do. So if I give you such service, I'm sure you do not mind paying for it in reason, would you?" Result—range boiler sold at $16.40, man's time putting in a satisfied customer and another proof that every sanitary engineer should be a merchant.

Before leaving our friend, the writer gleaned some very interesting and valuable information.

Was asked to look over a few pages of our friend's books. Saw that the sales made as a result of keeping a store, paid nearly 60 per cent. of the total overhead expenses of the whole business, while the actual merchandising cost was only about half that amount.

Not only so but the fact of having a store made it possible to have a shopman and bookkeeper, whereas a workshop only would not in this case have afforded the cost of even a workshopman.

In conclusion, and for the benefit of those who may still have doubts in their mind about "becoming a merchant," let us ask this question:—

How many sanitary and heating engineers are there who fail in business and who only kept a "shop" in comparison to those who start or eventually become merchants?

Further, which of the two classes make the biggest success in business? There is no doubt about it. The merchant sanitary and heating engineer wins oftener than not, and not only so but they are looked up with greater respect by their customers as a whole.

DO YOU BUY RIGHT?

Many firms are taking their semi-annual inventory of stock at this time of the year. It seems a good time to take an inventory of how that stock was bought and what its value may be for future use.

Plumbers are often gulled, through the persuasive eloquence of some salesman, into buying freak fixtures, under the plea of showroom display. Seldom it is that a sale, except at a sacrifice, is found for such articles. On the other hand, there are specialties which are kept constantly before the public so that a steady demand exists. It is up to the plumber himself to differentiate between these two classes of goods. An inventory of your buying methods may lead to some reforms, which will be a good thing for the manufacturer who considers a product sold only after it has left your hands and who with that object in mind advertises to popularize his product with the ultimate consumer.

TENDERS

Montreal South, Que.—Tenders received by the engineer, E. Drinkwater, 23 Lafayette Boulevard, St. Lambert, until 6 p.m., July 19, for waterworks, etc., costing $180,000, for the Town Council.

THE SANITARY ENGINEER

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JOHN BAYNE MACLEAN - *President*
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EDWIN NEWSOME - - *Editor*

Circulating amongst Sanitary, Heating and Ventilating Engineers, Gas Fitters, Sanitary Inspectors, City Engineers, Boards of Health, Architects, etc.

AUGUST 1, 1917

IT is all a matter of education or lack of it as to whether business is or is not a success. Caution, foresight and co-operation are all results of the educational training we have received.

Some years ago the use of iron pipe instead of lead for water supplies in our homes was going to ruin the business, but it did not, and why? Because it was of service to the public, could be adapted for so many other industries to advantage that in the main were very similar to water piping. The wiped joint still clings to every plumbing by-law in the land, but it will some day have to go, so will the lead caulked joint under certain conditions.

Another thing that would help the sanitary and heating engineer considerably is to have journeymen and apprentices better dressed. It is high time that our craft took a little more pride in the appearance of the man who calls upon his customers.

How do these matters come under the title of co-operation? it may be asked. Simply in this way: Are we not co-operating with our men in thoughts that are on the minds of the people? We forget that many of our customers are experts in other lines and are becoming more enlightened every day; they know and think more and can see the foolishness of our arguments when such are put up against the use of this or that.

Here is another example: We are holding aloof from the welding business; why should we? It is just as possible to burn up a sand hole or crack in a soil pipe as it is to do any other thing, but we are not looking into the matter as we should and other trades are adopting this method. We do not lend ourselves to that co-operative spirit that will cement our craftsmen and ourselves to other trades. A big steam line leaks and we go to the cost of taking it out. Our customers find that the fracture could have been welded over, and the idea at once strikes him that we are behind the times. Such thoughts as these are not conducive to our earning the respect of the general public.

Co-operation and application of the mechanical sciences that are around us will do more to lift us into a mechanically progressive trade than anything else. Small things that impress our customers will do a great deal towards getting their co-operation when we put our ideas before them in trying to get uniform by-laws put into force. As it is, when such a matter is mooted every person in the district looks upon such legislation with suspicion. It is just a matter of education. We should be the very ones to incorporate all new methods we can into our business; let go the old methods even if the new are only "just as good"; become more conversant with the outside world, and make it a point to be better able to mix and discuss the various phases of our business in a friendly way with our customers.

At one time "Competition was the life of trade," or so the world thought, but such thoughts are dead and gone. Co-operation is the life of trade to-day, and will win for us with less effort that which all mankind are striving for. Therefore, one thing above all is essential to our craft, and that is the spirit of co-operation and better fellow-feeling amongst us, both employers and employees.

A NEW PLUMBING BY-LAW

IT sometimes takes some of the small towns to show the big cities how to do things, and the proof of this statement is based upon the fact that New Toronto, a comparatively young municipality, has put into effect a new plumbing by-law. For some months it was not lived up to by many, but that was only to be expected for a while. However, it is interesting to know that the law will be enforced to the limit from now on and we will hail with delight the fact of any offenders being brought to time if they try to "put one over" on the powers that be. We should be the last in our trade to do such things, but sometimes this "putting one over" has a silver lining behind the act, as was the case in New Toronto. Many jobs

were put up not in accordance with the new laws, and this really brought matters to a head.

This new municipality should be congratulated and assisted by every man in the trade, journeyman and employer, and no doubt the officials will appreciate any assistance rendered.

PLUMBING BY-LAWS SHELVED

AS we have just complimented New Toronto for getting a new by-law put into force, we cannot refrain from mentioning two cities that have had by-laws proposed for a number of years and then side-tracked.

The craft at Ottawa as well as the officials in the plumbing inspection department put in many months of hard work and very serious thought into compiling a new plumbing by-law, and with what results? None. All their time, all their thoughts have, as far as putting the by-law into force is concerned, been set at nought. What is the matter, is the question that arises in our minds? SANITARY ENGINEER had the pleasure of commenting upon the by-law and in the main found it to be about as practical as a by-law possibly could be, and found that the Ottawa architects were raising some objections to it, or clauses therein, but to date, as far as can be learned, these objections have never been publicly stated. Why should architects object to the plumbing by-law being put into force in Ottawa? We can answer for them, and take pleasure in so doing:

"It is simply because they have a habit of objecting if they do not happen to be the whole cheese." Nothing but puffed up jealousy is at the bottom of it all. The architects are the root of 90 per cent. of our troubles to-day, and we should cut loose from them. Let us consult the owners ourselves and be responsible to the owner for our work.

There are scores of jobs right in Ottawa that are not what they should be simply because they were laid out and planned by architects instead of by practical sanitary and heating engineers.

Montreal is another big city that has had a practical plumbing by-law proposed, but for some unknown reason, or else for some very trivial matter, it has not been put into force, and every member of the craft knows well that the public of Montreal are suffering because of the neglect of their council in not putting it into force.

It certainly is a reflection upon the work of such councils when a little municipality like New Toronto can get men to do things, and do them right with such promptness, while they of larger cities are left in the rear with their dilly-dallying methods and inefficient attempts at getting things done.

OUT OF BUSINESS WITHOUT KNOWING IT

DID it ever occur to you, that there is many a merchant doing business to-day who would be better off financially if he sold his business, put the money in the bank and then sat back in his chair and prepared to take life easily? Not only that, but did it ever occur to you that the whole trade would be better off if this type of merchant decided to pass his remaining years in idleness?

The merchant referred to is of course the one who just sort of estimates what it costs him to do business. There is an actual discoverable cost that your particular business entails in its operation. This cost is discoverable, and must be provided for. If it isn't, why there is a continuous loss, it may be so slight that it is not really noticeable, but it is preventing this business paying a reasonable dividend, and by the unwise selling that results, it is having an effect on every business in the neighborhood. The idea is either to go into business thoroughly, or get out before it is too late.

CAUTION IS NEEDED

WE are spending a good deal of time of late congratulating ourselves on the fine condition of Canadian business. Merchants are doing well, profits are fair, business is good, and generally speaking, according to the authority of the commercial agencies failures have dropped to a level that is cheeringly low.

All this is good, and there is no reason why these conditions should not prevail, but it is to be remembered that they will not prevail of themselves.

At the moment there is nothing to test the metal of business. The lame ducks have long ago been weeded out, or at least the lamest ducks, and to-day business is apparently going along on a very stable foundation; for the moment there is nothing to test its strength. It must be remembered, however, that prices are abnormal. Goods are actually selling to-day at more than they are worth, which means that some day they are going to be considerably less. When that day comes there will be room for a good deal of heart searching. Short stocks and short credits are the only possible safeguards against returning normal conditions. For the danger is not only in any slump after the war, but in any actual return to the normal, for we have grown used to abnormality and have been building our lives and businesses upon it, therein lies the danger.

There is no ground for fearfulness, there is no ground for hide-bound cautions, but there is ground for cool-headed, common-sense, and any man who faces the future must realize that outstanding accounts and overwhelming stock are bound to be a reef on which an otherwise solvent business may go to pieces.

PRACTICAL SHEET-METAL WORK

BY THOMAS STANFIELD

IN warm air heating construction one of the most important elements to overcome is that of friction. Many a splendid installation as far as workmanship and neatness went, has been proved very inefficient on account of the amount of friction being set up by having too many acute angled fittings.

In this article a number of fittings are described which are made in such shape as to overcome friction.

In Fig. 1 is shown a fitting which very often has to be used when a beam, or trimmer is so placed as to be in the way of a stack pipe. A is the elevation from round to rectangle.

It will be seen that instead of this fitting being constructed with square corners, they are circular, and while a very trival change in construction is made, a lot of friction is overcome. B is the plan, and C is the pattern for top piece, D being pattern for the bottom piece.

To develop this fitting, the elevation is first drawn, and by allowing extra material for the seams, this may be used as the patterns for sides. a, b, c, d, in elevation shows the sectional view of joint over which the stack pipe fits.

Now divide the circular ends into equal parts, both ends being the same. Next draw two lines parallel with each other and same distance apart as shown in plan and described at C, and transfer these measurements 1, 2, 3, 4, 5 to top line at C, then measure from 5 to a, b. c, as shown, this will give the true length of material required for pattern of top piece.

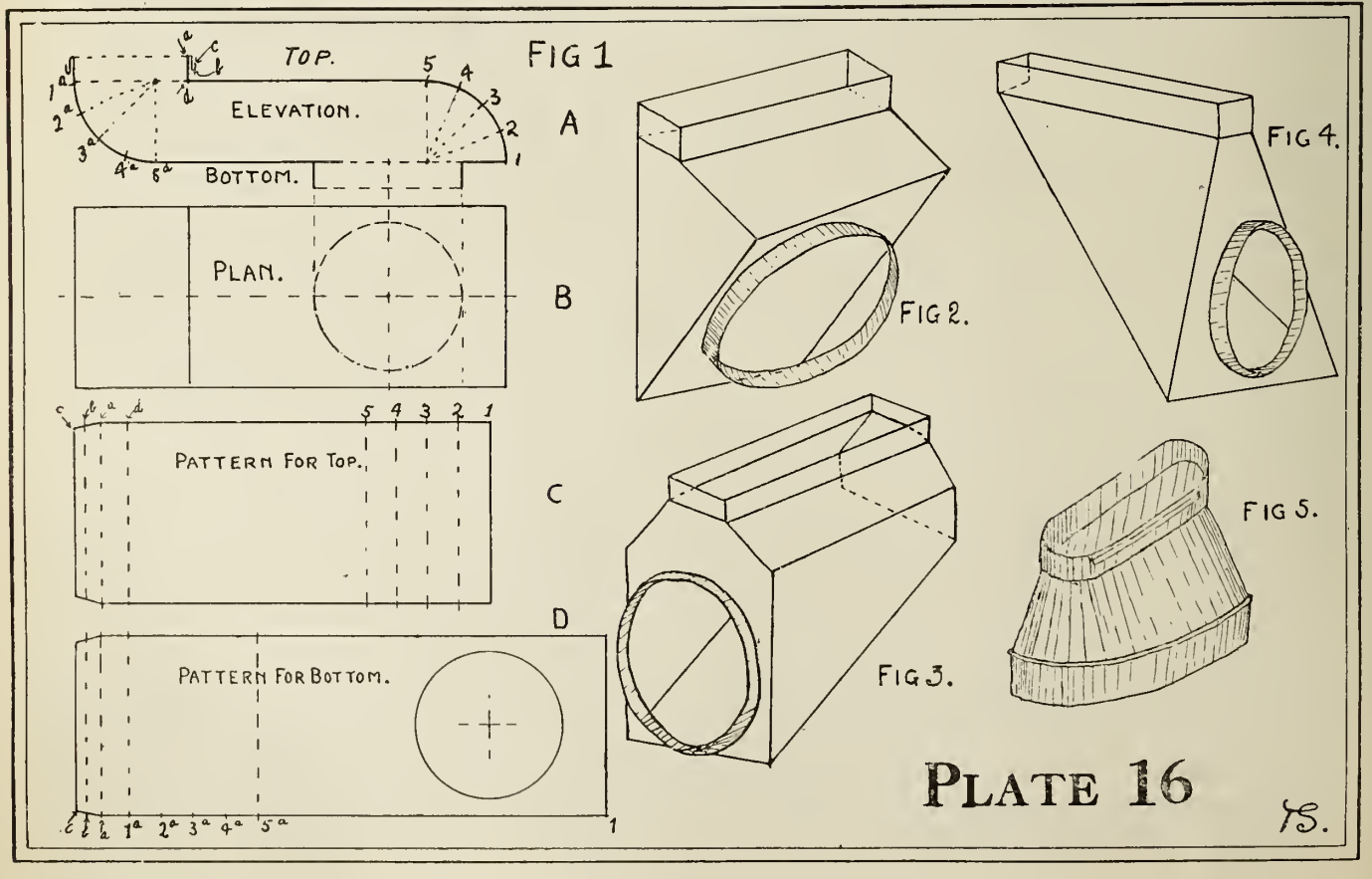
Follow out the same instructions for development of pattern for bottom piece. A round collar will have to be fitted into this pattern which is made and fitted as described in previous articles.

Figs, 2, 3, 4, and 5 are very useful and easily made fittings and can all be used to great advantage in many ways, with the sole object of eliminating friction where possible, with the exception of Fig. 5 these fittings are easy to develop, by using only a straight edge and rule.

(Continued in next issue.)

GASOLINE TANK EXPLOSION

Hugh Galway, employee of John Lewis Company, plumbers and steamfitters, Belleville, Ont., was recently the victim of painful burns about the face when a gasoline tank exploded. He had applied a torch to the tank to remove solder, and the vapor of gasoline caught fire and exploded. Fortunately his eyesight was not injured.



Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

PATENT quick-opening valves is one of the important lines to change price in an upward direction during the time since last issue. Cast iron fittings, cast elbows, tees and bushings are also among the lines to be increased in price through the changing of the discounts. There is a firm situation in conductor pipe, but prices at time of last issue have been maintained. Black sheets and boiler plates have been advanced, while galvanized sheets are still in an acute condition. There has been a disposition to move to higher levels on corrugated sheets on the part of some concerns. Old brass, copper and zinc are quoted at lower prices, due to the lack of buying demand on the part of mills and to a certain panicky feeling on part of dealers. Ingot metals quite generally show an easier tendency, due to the situation in the primary markets. Scarcity of labor is interfering with production of goods in a number of lines. Shortage of raw materials is another factor that is militating against the efforts of manufacturers. Business with plumbing supply houses has been fairly good during the month.

TORONTO, July 31.—A new phase in the building situation has perhaps been overlooked by some closely identified with the trade and which has been pointed out by a dealer closely connected with the manufacturing end. Prices are high for materials and supplies of all kinds and with those who have been accustomed to pre-war prices present prices seem prohibitive. There is, however, a class of builder who has not had the experience with these lower prices. The only prices within his ken are those that have prevailed recently. Accordingly he has no historical background with respect to prices and does not bother about making comparisons. He counts the cost of the materials on basis to-day and if he wants to build, he builds. Prevailing prices do not scarce him away. This is a feature of the plumbing trade that may have been overlooked by some. It perhaps accounts for the fact that reports of business have been from fair to good.

Demand For Ship Plates Affects Pipe Supplies

WROUGHT PIPE.—Manufacturers of steel pipe report operations in the manufacture of large sizes is greatly curtailed owing to the heavy demand for plates for steel shipbuilding. Shipbuilding being in the nature of Government business has the right of way over demand from domestic consumers. Smaller sizes of pipe are affected through the generally acute situation in the steel market. The same machines used for rolling plates for shipbuilding are utilized in making plates from which large sizes of pipe are manufactured. New business in wrought pipe has not been brisk as deliveries have been so slow on booked business that it is almost impossible to consider new bookings until present orders are cleaned up. Prices are holding steady at the advances announced in last issue.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917

Standard Buttweld	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 5 00	$6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES

4" and under, 45%

4" and under, running thread, 25%.

4½" and larger, 40%.

STANDARD COUPLINGS

4" and under, 35%.

4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces

New Buyers Not Afraid High Prices

ENAMELWARE.—Builders who have had no pre-war experience with materials are not hesitating to enter the market at the present time and secure the commodities for their needs. This is a class of buyer with whom it is easy to do business and dealers assert their belief that present demand for enamelware will keep up. Scarcity of labor is a factor that is interfering with production. Prices held steady during the week.

Bath-tubs, Roll Rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bathtubs, 5½ ft.	35 70
Sinks, Roll Rim, 18 x 30 in., staple	16 80
Closets, oak tank and seat	22.00
Do., enamel iron or white vitro tank	23.75

Cast Fittings, Tees, Elbows And Bushings Up

SOIL PIPE, FITTINGS.—By the change in discounts an advance in price has been recorded on cast iron fittings, elbows, tees and bushings. Cast iron fittings are now quoted from 20 per cent. to 15 per cent. off list, with cast elbows, and tees at the same figures. On bushings there has been a grading downward from the higher quotations, the new discount quite generally being 35 per cent. off list. Soil pipe and fittings remained unchanged and malleable fittings were also in steady market.

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	40%	45%
8-inch soil pipe	....	35%
Medium and extra heavy fittings, and under	....	50%

C. I. PIPE FITTINGS.

Cast iron fittings	15%	20%
Cast elbows, tees, etc.	15%	20%
Plugs	32%	35%
Bushings	..	35%
Flange unions, standard	22%	25 %
Dart unions, ¼-inch to 2-inch	25%	24 2-3%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4 in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.	0.50	0.62
Do., Class B, lb. net	0.22	0.31-33
Do., Class C, lb. net	0.15	0.21

Patent Quick-Opening Valves Advance 18%

VALVES.—An advance of approximately 18 per cent. has been made effective on the price of patent quick opening valves through the changing of the discount. Where formerly the discount was 45 per cent. it is now 35 per cent. Demand for steam valves of all kinds still keeps up remarkably well, although compression work, fuller work and some other classes are comparatively light in demand. Following are prices prevailing:

	Discount off list
Ground Work	50
Compression work, standard	52
High grade	45

Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	53
No. 0 and 1, compression	49
Midget	51
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Plumbers' Oakum In Fair Demand

OAKUM.—Dealers report the demand on plumbers' spun oakum has been fairly good with prices holding steady at recent quotations. In one instance the price in bales was advanced from $9.50 per hundred pounds to $10, with less than bales quoted at 12c per pound. Demand for marine oakums is not heavy in the central part of Canada but with the developing of wooden shipbuilding on the coasts demand for this should be increased.

	Per 100 lbs.	
Best American	....	$21.00
U.S. Navy (American)	....	20.00
Plumbers' Spun	8 50	12.00

Replacing Of Range Boilers Makes Demand

RANGE BOILERS. — Manufacturers of range boilers report that need for replacement of ranged boilers is apparently causing a good demand when limited supplies are considered. Supplies of materials are difficult to obtain and there is trouble in meeting demands in consequence. Manufacturers are behind with orders and scarcity of labor is further restricting output. Prices remained unchanged.

30-gallon range boilers, standard	$13.00
35-gallon standard	14 50
40-gallon standard	15.50
52-gallon standard	28.00
30-gallon extra heavy	17.00

Eavetrough And Conductor Pipe Hold

EAVETROUGH, CONDUCTOR PIPE. —There is a continuation of the firm position in eavetrough and conductor pipe noted last week. Manufacturers are unable to get additional supplies of galvanized sheets booked up, and they state present costs are too low compared with the market in the plain galvanized sheets. These commodities are still being quoted at a discount of 10 per cent. off list.

Black Sheets And Boiler Plate Advance $1

SHEETS, PLATES.—As intimated in these columns previously that an advance was highly probable in black sheets of Nos. 10 and 28 gauge, such advance has taken place, and is even more sweeping. Gauges Nos. 12, 14 and 16 have also been advanced $1 per 100 pounds. On gauges Nos. 18 to 28 the increase amounts to 50c. One-quarter inch boiler plate has been advanced $1, and is now quoted at $12, while 3-16 inch plate has been advanced $1.15 per 100 pounds, and is quoted at $12.25. There were a few cars of black sheets that reached the local market from the mills during the week, but stocks are depleted, and orders previously placed take care of any additional arrivals as soon as they get in. The lower quotations were still maintained, but practically no new orders are being taken on this basis, owing to the need for filling orders already placed.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$	$10 50
12 gauge	10 05	10 60
14 gauge	9 95	10 65
16 gauge	10 00	10 75
18-20 gauge	9 80	10 30
22-24 gauge	9 85	10 35
26 gauge	9 90	10 40
28 gauge	10 00	10 50
29 gauge	10 10	....
3-16 inch plate	....	11 10
¼-inch boiler plate	....	11 00

GALVANIZED SHEETS—	Per 100 lbs.
10¾ oz.	$12 00
U.S. 28	11 70
U.S. 26	11 40
22 and 24	11 25
18 and 20	11 10
16	10 95
14	10 85

F.o.b. Hamilton, Toronto.

Corrugated Sheets And Siding Very Firm

CORRUGATED SHEETS, SHINGLES. —Manufacturers report that it is still extremely hard to get materials for the manufacture of corrugated sheets, galvanized shingles and metal siding. Dealers point out that on the present basis these commodities are selling about on a par with the price of galvanized sheets. In the United States the galvanized sheets are quoted on a basis considerably higher than present costs locally. Furthermore, they are unobtainable from the mills in the United States.

Lower quotations given for corrugated roofing sheets last week have been advanced in certain quarters 30c. per 100 square feet. One concern is still quoting on the lower basis, but the price at which a second concern is selling is $9 for No. 28 gauge and $9.90 for No. 26 gauge. Metallic roofing and wall materials are in firm market and manufacturers state that higher prices are warranted and may be put into effect in the near future. There is also a firm situation on metal siding and shingles. Range of prices are as follows on corrugated sheets:

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7 20
No. 26 gauge	9.60-10.00	....

Brass, Copper And Zinc Quoted Lower

OLD MATERIALS.—There is a weaker tone in the market for old brass, copper and zinc as a result of a corresponding condition in the United States. Brass was quoted down ½c, and heavy copper and heavy zinc were also down ½c per pound in the amount being paid by large wholesalers. There is a lot of old materials being offered by dealers, and this is further helping to depress the market in view of the fact that consuming mills are not in the market at the present time.

Tea lead	$ 0.08¼	.....
Heavy lead pipe	0.11	.....
Yellow brass	0.15¼	0.15½
Red copper	0.22½	.....
Light brass	0.10	.....
Heavy zinc	0.07½	.....
Heavy copper	0.25½	0.26½
Old cast iron, per ton	....	25.00

Prices Of Lead And Zinc Products Hold

LEAD AND ZINC PRODUCTS. — There was a continued good demand for lead and zinc products during the week with prices holding steady. Lead in the primary market manifested no inclination to change in either direction. Zinc on the other hand exhibited some strength and was advanced slightly. In the face of present conditions a change is not anticipated in the very near future.

Lead pipe, lb.	$ 0 19	....
Lead waste pipe, lb.	0 20	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 17	....
Lead sheets, 3 lbs. sq. ft.	0 17¾	....
Lead sheets, 3½ lbs. sq. ft.	0 17¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 17½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 42	....
Solder, strictly, lb.	0 41½	....
Solder, commercial, lb.	0 40	....
Solder, wiping, lb.	0 40	....
Solder, wire, lb.	0 45	....
Zinc sheets, per lb.	0 26	....

Boiler Tube Demand Is Reported Lighter

BOILER TUBES.—A lighter demand for boiler tubes is reported by dealers during the past week than that prevailing for recent weeks. It is anticipated, however, that overhauling of boilers in preparation for the winter will soon commence and that a consequent demand will develop. Prices were firmly maintained during the week.

1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
3½-inch	70 00	55 00
4-inch	82 00	67 00

Metals Generally Show Lower Prices

COPPER.—In view of the possibility of considerably lower prices on copper, consumers are keeping out of the market, only covering for more urgent requirements. Copper has declined 1c locally, lake and electrolytic being quoted at 35c and castings 34c per pound.

TIN.—A decline in the London market has been followed by lower prices locally. Tin has declined 2c locally, and is now quoted at 63c per pound.

SPELTER.—The market is dull, and prices have declined a half cent. The

(Continued on page 32.)



TRADE GOSSIP

Grandmere, Que.—Town Council contemplates installation of pumps, etc., costing $10,000.

Oshawa, Ont.—A by-law has been carried calling for the construction of a $38,000 filtration plant.

CONTRACTS AWARDED

London, Ont.—Webster Construction Company, Wm. McCracken, and Mitchell & Mohan, have contracts for construction of sanitary sewers costing $7,000, for the city.

Niagara Falls, Ont.—W. G. Read, Victoria Ave., has plumbing and heating contract in connection with the erection of a $20,700 brick fire hall for the City Council.

St. Ferdinand de Halifax, Que.—O. Picard & Fils, 199 St. John Street, Que., have the plumbing, heating and electrical work for convent for the Sisters of Charity, St. Olivier St., Quebec.

Trail, B.C.—The Alberta Clay Products Co., Medicine Hat, and the British Columbia Pottery Company, have contracts for supply of sewer pipe in connection with water supply and sewage system costing $50,000, for the city.

INDUSTRIAL NOTES

Sarna, Ont.—H. Mueller Mfg. Co., River Road, are having plans prepared for a $200,000 brass rolling mills.

Shawinigan Falls, Que.—The Electric Products, Light & Power Co. plan a $36,000 brick addition to plant. Engineer, R. Lindsay.

NOTES

Sarnia, Ont.—A by-law for $25,000 will shortly be submitted to the people for an incinerator plant. John A. Baird, city engineer.

Galt, Ont.—It is believed that there is considerable leakage in the water mains, and the Water Commission is considering the advisability of making a test to find the leaks. Dr. Radford, chairman of the commission, suggests buying a pitometer.

Windsor, Ont.—This city will refuse to recognize an estimate of $40,300 as its share of the apportionment of the cost of the proposed sewer and water improvements submitted in a report by Maurice Knowles, engineer of the Essex Border Utilities Commission. At a recent meeting of the commission, Mayor Tuson declared the city will not sell its waterworks, but is ready to supply water at a reasonable rate.

Weston, Ont.—Plans and data for the reconstruction of the sedimentary basin and the laying of a new intake pipe, have been ordered by the Weston Water, Power & Light Commission, to be ready by July 24, so that tenders may be called for as soon as possible. This action was taken upon a special report submitted by Engineer E. A. James, of Toronto, in which he advised immediate adjustment of the water system, as the present equipment does not meet the growing demand of the town.

VANCOUVER'S SEWER PIPES

The city of Vancouver, B.C., in the course of the last five or six years, has laid a considerable mileage of cement sewer pipe, manufactured by a local company, and the example thus given was followed by the city of New Westminster and a number of smaller municipalities. It is said that recent discoveries made by officials of the Vancouver sewerage department seem to have led to the belief that the cement pipe is not standing up well in its work, and that a serious mistake was made in the selection of that type instead of the vitrified article. The matter is now being investigated by the Board of Works Department of the City Council.

ACID DAMAGES HAMILTON SEWER

Mayor Booker, of Hamilton, along with the controllers and city engineer, recently made an inspection of public improvements and visited the plant of the Canada Screw Company, where some damage has been done to the sewerage system by hydrochloric acid. The city claims that the acid has eaten away the brick in the Cathcart Street sewer, and wants the company to divert its sewage into the sewer on Wellington Street, which has been made immune to the ravages of hydrochloric acid. The city may also insist on damages being paid for the damage done by the effluent from the screw company's plant to the Cathcart Street sewer.

U. S. GOVERNMENT TO AID GOOD ROAD BUILDING

The State Legislature of Washington has passed a bill assenting to the requirements of the Federal Government with respect to Federal aid in road building. The only type of pavement being considered in Washington in connection with Federal aid money is concrete. So far this year, all contracts for permanent pavement have gone for concrete construction.

FILL CARS TO CARRYING CAPACITY

If every shipper whose commodities have to make a rail trip before reaching the consumer were to load cars to maximum, or the 10 per cent. excess authorized, there would be little or no car shortage. For example, one of the large cement manufacturers has recently made good in this respect by loading all of its shipments to 108 per cent. of the marked capacity of cars.

INCORPORATIONS

Toronto, Ont.—Canadian Incinerator Company, Ltd., has been incorporated with a capital stock of $50,000 to manufacture boilers, tanks, incinerators, furnaces, pumps, etc.

Hespeler, Ont.—A. B. Jardine & Co., Ltd., has been incorporated, with a capital of $300,000, to manufatcure machinery and plumbers' supplies. William Jardine, James Jardine, Peter Jardine, Andrew Jardine and John Jardine are the incorporators.

Toronto, Ont.—Engholm & Partners, Limited, has been incorporated with a capital stock of $100,000 to carry on business of structural, civil and mechanical engineers, and to work on irrigations, sewage drainage, sanitary and works or conveniences of public utility. Frank Goldie Engholm, engineer, and H. A. Hall, law student, are the incorporators.

Winnipeg, Man.—Rapid progress is being made with the construction of the big lock-joint aqueduct from Deacon to the Red River. The Lock Joint Pipe Co., acting as sub-contractors for the Winnipeg Aqueduct Construction Co., have fully 20 per cent. of the pipe made and ready for laying. The only remaining contract to be let is that for the big syphon under the Red River and piping on to the McPhillips reservoir, but this, together with the projected reservoir on the site of the present Victoria Park, will, it is thought, not be commenced until the winter of 1918-1919.

PLUMBERS REGISTERED

Montreal, Que.—A. Mathieu & Co., plumbers, have been registered.

OBITUARY

Toronto, Ont.—F. S. Henning, for years superintendent of the Island Filtration Plant here, is dead. He was the inventor of the chlorinating plant used for the city water, a system which was adopted by a number of American cities. Before entering the city's employ in 1910, Mr. Henning was a marine engineer, and was Grand President of the Canadian Marine Engineers.

IMPROVE WATER SUPPLY

Chatham, Ont.—The Water Board and Dr. T. L. McRitchie, M.O.H., are taking concerted action to improve the civic water supply, which has been contaminated for some time. The water mains are being flushed to remove decayed matter, and the dose of chlorine has been increased.

JUNE REPORT OF WORK DONE BY WINNIPEG PLUMBING DEPARTMENT

Whatever the cost of a plumbing inspection department is, there can be no doubt about the fact that the service rendered cannot be reckoned in dollars and cents.

It is shown by the following report that the staff of the plumbing division alone made over 704 calls during the month of June.

In addition to this work the above department executed work that must be done by men of experience.

Plumbing Division.—Permits issued 101, water tests 86, smoke tests 158, subsequent inspections 266, miscellaneous inspections 16, defects rectified 178.

Sewer Division.—Permits issued 20, connections constructed 23, inspections 137.

Sewer Flushing.—Tank flushing 1,474,816, hose flushing 763,125, total gallons 2,237,941.

STEAMFITTER'S LIFE SAVED

The plucky action of William Strong, a rivetter at the Polson Iron Works, Toronto, saved the life of Percy Clews, a steamfitter, who fell overboard from the steamer "Vimy," which was moored opposite the Polson dock. Clews fell into thirteen feet of water and sank instantly, being unable to swim. Strong dived for him and after ten minutes succeeded in bringing him out.

NEW TORONTO PLUMBING BY-LAW

A new by-law governing the installation of plumbing has been recently put into force. It was really compiled and passed as far back as October last, but on account of the lack of publicity, very few members of the craft were aware of the fact. This led to many serious misunderstandings and work was installed that was in accordance with the by-law.

This new by-law is being re-printed in SANITARY ENGINEER, beginning with this issue. It will be noted that quite a few novel and very practical clauses are embodied in this by-law, which will prove of interest to every member of the trade.

BUSINESS SERVICE ADDRESS

At the regular meeting of the Toronto Society of Domestic Sanitary and Heating Engineers held July 18, an address was given the members on business Service by Mr. C. D. Henderson of Brantford.

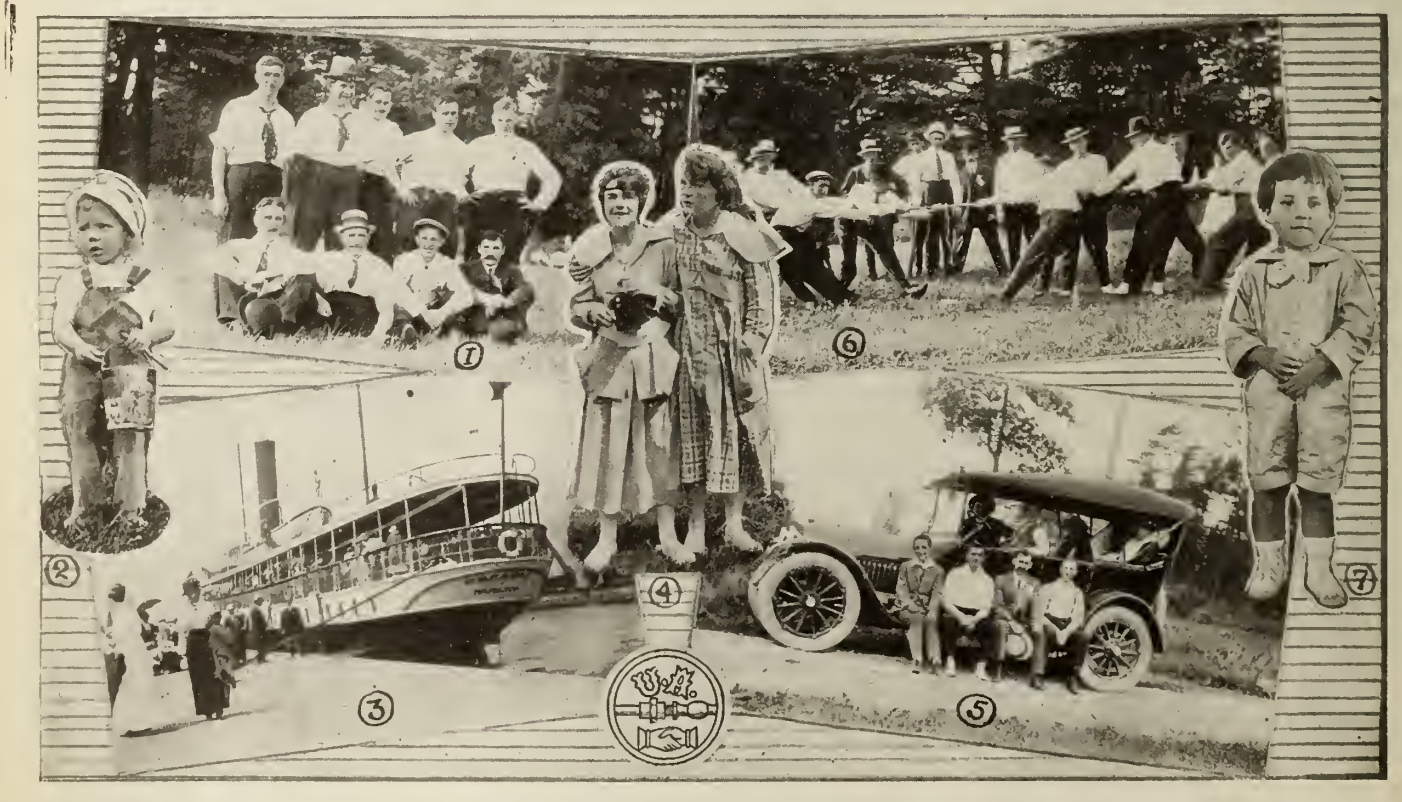
Mr. Henderson dwelt largely upon the fact that if sanitary and heating engineers were ever to be looked upon as respectable business men, they must cut out lose methods of doing business.

He pointed out that one of the greatest assets in business is the character which is instilled into a person. If a concern is run on sound business lines, it influences every one so engaged. Mr. Henderson is manager of the Henderson business service, Brantford and also explained upon special request his company's retail price service for the sanitary and heating trade and outlined the benefits to be derived from the service.

Considerable discussion took place as to the numerous phases that might arise in connection with the service, but it was agreed unanimously that the uniformity of prices and methods of arriving at a fair price for goods sold was very much neglected by the trade as a whole. Mr. Henderson stated that quite a number of members in the trade were using the service through the province of Ontario, a hearty vote of thanks was tendered to Mr. Henderson for the splendid and educative address.

WEST COMING BACK

From reports out West business in the sanitary engineering field is good. The trade in and around the larger cities are devoting their time catering to the farmers and rural residents.



1. *The winners at Baseball.* 2. *Master Water Phillips.* 3. *Changing boats at Burlington Beach.* 4. *Miss G. Shea and friend trying to snap the Editor of* THE SANITARY ENGINEER. 5. *John Wright and friends in his "buzz car."* 6. *Local* 46 *getting into action ready for pulling Hamilton boys all over the map, and they did.* 7. *Master Woods, a prospective reader of* THE SANITARY ENGINEER.



1. *Bill Storey "getting into action."* 2. *A few of the girls "ready for action."* 3. *J. E. Woods and son.* 4. *John McMurray ready to ring the Girmsby Fire Bell.* 5. *Led "by" an Halter, to get feed of hay, Bob Pratt in the act of taking a bite.* 7. *Moonlight at Grimsby Beach.*

Annual Excursion and Picnic

Local 46, Toronto, Enjoys a Splendid Day's Outing to Grimsby Beach—Over 300 Take in the Event.

ONE of the most successful and enjoyable picnics ever experienced by the members and friends of Local 46 was that which took place on Saturday, July 21.

The weather was ideal and a goodly crowd attended.

A splendid programme was prepared and carried out in a very able manner. The committee consisted of the following members. It goes without saying that they planned well, and carried out all that went to make the twenty-fourth annual excursion and picnic a credit to them:—R. A. Pratt, F. W. Jenkins, M. Higgins, E. Brittain, J. J. Sullivan, D. B. Rattray, E. W. Phillips, J. A. Rattray (chairman), T. H. Mosses (secretary).

The boat was a little late in arriving at Grimsby, and a few of the items on the programme had to be hurriedly gone through. The kiddies were in good fettle, and showed that some of them had attended similar events before. This was proved by the way they arranged themselves for the fray; but as very few of them drew blanks, most were satisfied.

The following programme was thoroughly enjoyed:

1. Children's Race—Prizes for all—Value $15.
2. Girls' Race—6 years to 9 years—3 prizes.
3. Boys' Race—6 years to 9 years—3 prizes.
4.—Girls' Race—10 years to 14 years—3 prizes.
5. Boys' Race—10 years to 14 years—3 prizes. 1st, 2nd, and 3rd prizes consisted in each event of $1, 75c and 50c.

The following events carried three prizes, valued at $2.50, $1.50 and $1 respectively:

6. Married Ladies' Race—Open to all.
7. Single Ladies' Race—Open to all.
8. Married Ladies' Race—Members' wives.
9. Novelty Necktie Race—Partners—3 prizes.
10. Helpers' Race.
11. 100 Yards—Married men—Local 46.
12. 100 Yards—Single men—Local 46.
13. Special Race.
14. 100 Yards—Over 40 years—Local 46.
15. Open Race—100 yards.

Tug-of-war—Local 46 v. Local 67—Individual prizes.

A drawing competition also took place, and the three winners appeared to be very well pleased with the prizes secured.

The following were the winners in the above events from No. 6 inclusive: 1st, 2nd and 3rd in the order given.

6. Mrs. M. Higgins, Mrs. W. Guyer, and Mrs. R. J. Fleming (not of T.S.R. fame).
7. Miss G. Shea, Miss "What's-her-name," and Miss E. Shea.
8. Mrs. M. Higgins, Mrs. R. J. Fleming (no connection with the other Fleming), and Mrs. R. Pillar.
9. No one likes to be led round by a halter, so THE SANITARY ENGINEER could not procure the names.
10. W. Ward, P. Hurley and B. Sparks.
11. D. B. Rattray, W. Russell, and S. Good.
12. T. J. O'Brien, B. Sparks, and H. Boddington.
13. W. Fletcher, T. H. Mosses, and T. McLean.
14. M. Higgins, W. J. Storey, and P. Bisset.
15. D. B. Rattray, W. Ward, and W. Russell.

The tug-of-war between a number of Hamilton boys, members of Local 67 and Toronto Local 46, was won by the latter.

There was, of course, the usual excitement with the children's race. In fact, the speed made was so "speedy" that the camera could not record it; the picture had the resemblance of one big streak drawn across the field.

It will be noted that "Bill" Storey only got one prize, because of the fact that he proved such a "hummer" at the table, everybody refused to be put up against him. He is shown in one of the pictures getting into shape to take all before him.

The young ladies' and married women's races were splendid; but what with shortened skirts and the way some of the ladies "cleared for action"—well, we didn't want the "censor" to get THE SANITARY ENGINEER, so didn't publish them.

There was "some" excitement at the baseball game. Talk about a bunch of women scrapping. Why, that would be nothing to the way the winners and losers set the pace, all over a score of 14 to 0 in favor of the plumbers. But the fact of the matter was, the fitters were trying hard for "long runs," so as to get the job finihsed, while the wipers

(Continued on page 32.)



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WELL TOO DEEP FOR OUTFIT

Editor The SANITARY ENGINEER.

I was interested in those articles you published some time ago on installing pneumatic water systems, and would like you to help me out of some trouble in connection with a job. It is very much of the same nature as the case you published some time ago where a well had to be deepened.

I put the plumbing in this house several years ago, but the water from the roof of the house was drained into a tank in one of the attic rooms, the roof being partly flat. The well at that time was used for drinking water. However, the tank has begun to leak; there are more people living in the house now, and I want to put a pneumatic tank in for my customer. I might say that he does not want to build a house for the pumping outfit, and the well is 60 feet deep.

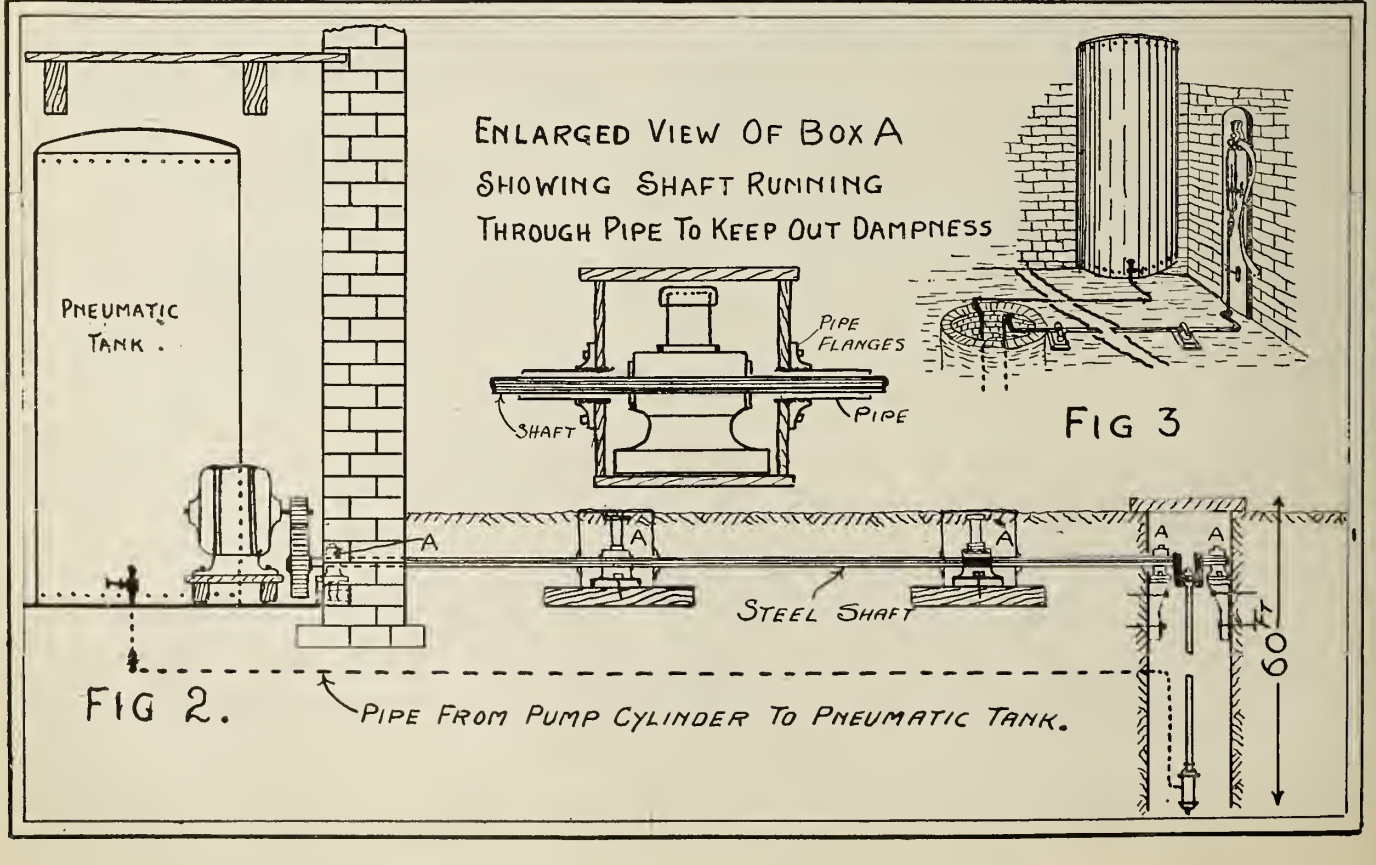
How can I instal a pneumatic tank in the cellar when the well is 60 feet deep? It is only 12 feet away from the inside wall of the basement (see enclosed rough sketch).

A NEW READER.

Fig. 1 is the sketch referred to, which shows in itself the problem. Our inquirer, however, does not say whether he wishes to instal an engine, motor or a hand system, or even a windmill outfit, because it is possible to use any of these methods and have the pneumatic tank and power in the cellar, with the exception of the windmill. Fig. 2 shows how the electric or gasoline engine can be installed. Fig. 3 shows how a hand outfit can be installed, and, of course, if a windmill is used for power, it is simply a matter of piping the pump to the tank in the basement, because the pump rod would likely be in direct line with the cylinder in the well, and in that case the pipe from well could be installed, as shown in Fig. 2.

It should not be forgotten that when a shaft is run underground, it must be protected from moisture or dirt, and to do this properly, the job should be laid out on the top of the ground, and boxes made in sections that can be screwed or nailed together. The pipe must be put on the shaft and screwed flanges placed at predetermined distances, so that they can be fastened on the boxes.

A little care in lining up the shaft will be found worth all the time so spent. (Continued on page 32.)

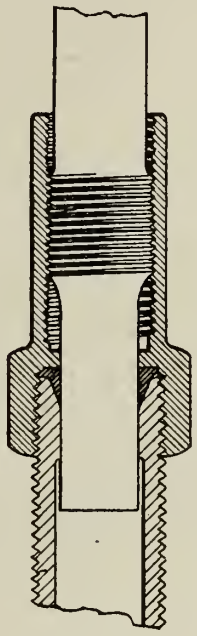


ADJUSTABLE

Screw Joint Coupling

for Supply Pipes

(Letters Patent No. 162,577)



The illustration shows the principle of application. The threaded shoulder on supply pipe engages internal thread of Screw Joint Coupling, allowing a total adjustment of TWO INCHES.

In addition to the adjustable feature, PACKING RING effectively prevents the possibility of LEAKS.

The Adjustable Screw Joint Coupling represents a combination of Common-Sense and Experience. It has justified expectations that it would perform an ordinary service in an extraordinarily efficient manner.

Fitted on all Noblo Supplies.

Manufactured by

H. Mueller Manufacturing Co., Limited

SARNIA, ONTARIO

THE QUESTION BOX

(Continued from page 30.)

It will be noted that Fig. 3 is simply shown so as to give the reader an idea how very simple a matter it is to use an old wall pump outfit.

The writer installed just such a system many years ago, when wells used to be dug inside the houses. There are thousands of such wells in European countries even to-day, and when it was necessary to fasten the pump to the wall, the work was done as shown in Fig. 3, using the cylinder that came with the pump.—Editor.

Should Joints Be Open?

Editor the SANITARY ENGINEER:

The question came up recently when discussing sewage disposal systems for country homes, regarding the proper way to lay the field tile pipe. Whether the joints should be left open or closed, and whether there are conditions when these pipes should be placed butt up close. I know you have advocated that these pipes should be laid ¼ inch apart, but would like to know what you would advise where the soil is sandy loam, or whether there are conditions which would warrant these pipes being placed close up at the joints.—An Ontario Reader.

This may seem a very simple question to many, but it is the very reverse.

The proper way to instal the field tile pipes referred to is to leave an open space of from 3/16 to ¼ inch. No matter what kind of soil they are laid in, but, these joints should be covered with stones or broken tile, slate, coke, cinders or some other medium so as to prevent the earth or sand from washing into the pipes. Not only should the pipes be covered, but should by right also be laid at the joints on some rough open material as mentioned.

This is not theory, but actual practice, proved by years of experience. This material placed at the open joints not only serve the purpose of keeping out sand and earth, but also assist the proper working of the bed by increasing the absorption.

For our inquirer's benefit, we will quote from a number of the best known authorities, all of which prove that the persons who contend that the pipes referred to should be laid close, is absolutely wrong.

No one have a right to a wrong opinion if that opinion involves the health and life of his or her fellowman and THE SANITARY ENGINEER stands for those practices and preachments that have proved their truthfulness through volumes of experiences. We know there may be exceptional cases, but true progress is not founded upon exceptions.

J. J. Cosgrove says in his book on Sewage Purification and Disposal that "the branch distributors are made of ordinary drain tiles 1 foot long and 3 inches in diameter. The tiles are laid with a space of at least ¼ inch between the ends, which rest on earthenware gutters and are covered with earthenware caps to protect the joints."

In another paragraph Mr. Cosgrove says "The caps and gutters are made with a larger radius than the drain tiles, so that the sewage may escape freely from the joints into the trench."

William Hutton in his book entitled "Country Plumbing Practice," shows a number of illustrations all of which illustrates the field tile pipe as being laid with open joints, and says: "These pipes are usually 3-inch field tile, have no hubs and are simply laid end to end about ½ inch intervening between the lengths. To prevent dirt from finding its way into the pipe and so obstructing the flow of water, it is customary to cover the upper side of the joint."

Col. Geo. E. Waring, one of the best known authorities on the subject of sewage disposal systems, also advocates that "Their joints be laid open about ¼ inch and being protected against the entrance of earth by a loose fitting cap laid on top."

A large concern manufacturing specialties for small sewage disposal systems also says "Ordinary hub tile or field tile may be used, laid on coarse gravel or cinders, with loose open joints."

We might add, that while all the above named mention "a cap", etc., we have found that stones, cinders and the like will answer the same purpose and are not as costly.—Editor.

ANNUAL EXCURSION

(Continued from page 29.)

just plugged every vent and got the test on in short orders.

Talk about getting the heat on a job. It certainly was warm at Burlington. Old Sol must have been on his way to give Hamilton a hot day just about the time the good ship "Macassa" arrived.

Another pleasant event took place when John Wright and party made a call on the playgrounds. Quite a few of the boys passed the time of day and a hearty handshake with John, and all appeared to be pleased to see John "out of harness"; it's certainly a sight for sore eyes.

Mr. Wright and friends were en route by auto to Niagara-on-the-Lake, the family's summer home.

The games over, the prizes all distributed, and an early start for the boat, ending with the return trip, cool breezes and smooth lake, brought the 24th annual picnic and excursion to a happy close.

MARKET REPORTS

(Continued from page 26.)

demand is light. Local quotations, 11c per pound.

LEAD.—The market is still weaker and prices have been forced down. Lead has declined 1c, and is now quoted at 13c to 13½c per pound.

FOR SALE

A SNAP FOR SOME TINSMITH—A COMplete set of tinner's tools, almost new, at considerably less than to-day's prices. May be seen at or complete information may be secured from Pease Foundry Company, Limited, 45 King William Street, Hamilton.

"PURO-FY"

(MADE IN CANADA)



THE American Museum of Safety conferred a Gold Medal Award upon the Puro Sanitary Drinking Fountain at the First International Exposition of Safety and Sanitation.

The Puro Sanitary Drinking Fountain won because it deserved to win—Puro had merits that made it stand head and shoulders above any other drinking apparatus.

Safe Simple
SANITARY Economical
Quickly Attached

These are the qualities that forced the leading safety and sanitary engineers to pick Puro in preference to all others.

No device can be as efficient that does not contain all these qualifications; and Puro was not tied for first place; Puro was first.

Don't be satisfied with half-way goodness, or makeshift drinking arrangements for your employees.

If the men in your factory must drink, give them a clean drink.

Puro is clean—it does not rust or corrode.

Puro is economical. It allows just the proper amount of cool, clean, fresh water to come through the bubbler. No spurting, no overflowing, no loss. Puro regulates itself. You can attach it in five minutes.

Tell us how many men in your factory and your water pressure in pounds—

We'll tell you just what it will cost to "PURO-FY" YOUR WATER SUPPLY.

PURO SANITARY DRINKING FOUNTAIN

TRADE MARK

147 University Ave, TORONTO, ONT.



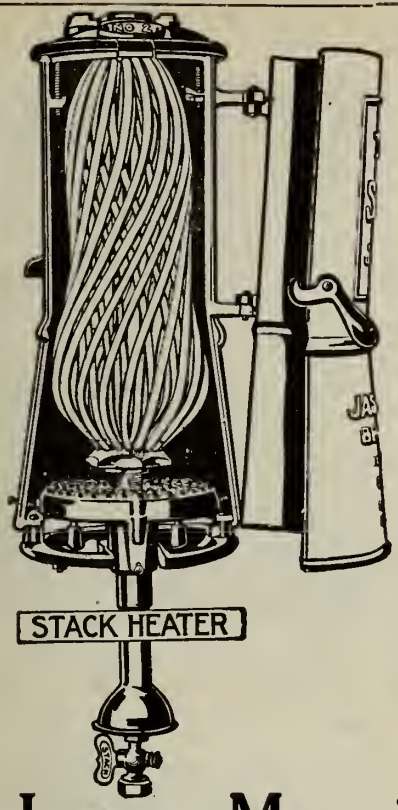
Vent Caps

Clearing screws, and drain checks prevent flooding Machinists, Brass Finishers and Plumber ialties.

MALCOLM and COMPANY
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FOR SALE

UNDERWOOD TYPEWRITERS.—Modern visible machines equipped with such improvements as back spacer, bi-chrome ribbon, tabulator and automatic ribbon reverse. Five year guarantee. Sold for cash or payments. Free trial. Send for proposition to-day and save more than half regular price. Address, Arthur O. Secord Co., Limited, Dept. 2, Brantford, Ontario.



STACK FACTS

From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited

93-97 Adelaide Street West, TORONTO

WE ARE SPECIALISTS IN

OUR OWN LINE



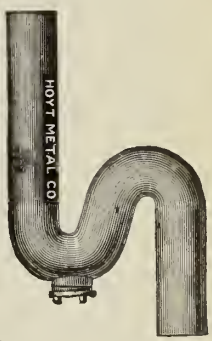
When buying wiping, bar, or wire solder, ask for HOYTS.

This is the day of the specialist. When you buy lead traps, lead waste pipe, lead bends, etc., you should see that quality is the outstanding feature. If you don't you are liable to pay in wages for lost time far more than the goods are worth. We make a special study of the lines we make.

Our Mixed Metal Sales Amount To Over $5,000,000 Annually.

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y., London, Eng., St. Louis, Mo.



Your jobber can supply it; if not, write us.



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

Advertising Lowers the Cost of Living

By DON FRANCISCO

Advertising Manager California Fruit Growers' Exchange

VARIOUS causes are assigned for the present high cost of living, one of which is that the consumer pays the millions and millions of dollars spent each year for advertising. That the consumer does pay the advertising bills cannot be denied, but this acknowledgment does not by any means imply that advertised goods cost more than goods that are not advertised.

As a matter of fact, goods that are not advertised can seldom be sold as cheaply as goods that are widely advertised. Advertising creates an enormous demand for goods, and this demand calls for the greatest possible efficiency in manufacturing and the most exacting economy in buying raw products. It is quite easy to see that the automobile manufacturer who makes and sells but five hundred machines a year could not possibly sell as cheaply as the manufacturer who makes and sells fifty thousand machines. The consumer, of course, pays the advertising bills, but the larger manufacturer has so reduced the cost of manufacturing and makes such great savings in buying material, and through efficient methods of distribution, that he saves the buyer many times the cost of the advertising.

The assertion is also made that advertisements are so subtly worded that many purchase goods which they do not need, or at least, for which the need is not very pressing. There is little doubt that there are many things which we could do without. Our forefathers got along very well without many of the comforts of modern living. And yet, who of us would give up our modern conveniences and comforts because they cost money? Who would go back to the kerosene lamp because electric lights cost more? Advertising has since increased the comforts of living, and if these comforts and conveniences cost more, they are certainly worth it.

Advertising has made possible the purchasing of guaranteed goods. If goods were not advertised one could not buy with the confidence that the purchaser possesses to-day. The public has learned in fact that goods that are advertised possess merit—that the advertiser is confident that his goods will give satisfaction, else he would not risk money in buying advertising space.

Advertising has made it possible to buy intelligently—to choose—to discriminate—to select the very article wanted, at the price that one can afford to pay for it.

Advertising whets competition, and when competition is keen, prices are as low as it is possible to make them. If merchants and manufacturers did not advertise, there would be no set prices—no settled policies of selling.

WILLIAMS' "VULCAN" CHAIN PIPE VISES

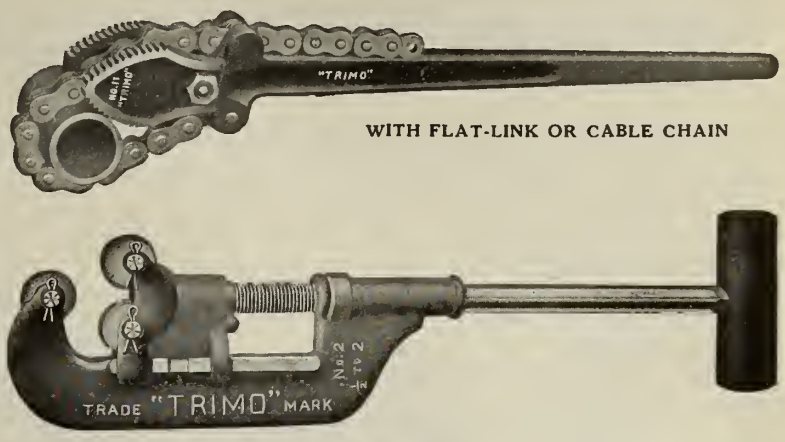


Only the penny wise begrudge the price of "VULCAN" sufficiency. Experienced buyers will take nothing else.

J. H. WILLIAMS & CO.
THE WRENCH PEOPLE
77 RICHARDS STREET BROOKLYN, N.Y. CITY

World-Famed Specimens of the Age of Steel

TRIMO TOOLS



Send for Catalog No. 91

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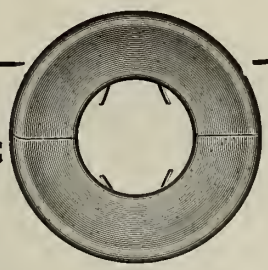
TRIMONT MFG. CO., 55 Amory St., Roxbury, Mass., U.S.A.

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OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

Tenders wanted for Plumbing Pipes and Fixtures

Parliament Buildings, Ottawa

SEALED TENDERS will be received by the undersigned until Noon, August 27, 1917, for Plumbing Pipes and Fixtures required in the re-construction of the above building.

All Tenders to be based on the execution, erection and completion, including all labour and materials required for the installation of the Plumbing system, together with all fixtures, apparatus and appliances as called for in the Plans and Specifications.

Plans, Specifications and any other information can be obtained at the Office of the General Contractor, P. Lyall & Sons Construction Company, Limited, Ottawa.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Minister of Public Works, for a sum not less than Ten (10%) per cent. of the amount of the tender which will be forfeited if the parties tendering decline to enter into a contract when called upon to do so. If the tender is not accepted the cheque will be returned. The total security will be forfeited if the contractor fails to complete the work contracted for. Payments will be made monthly and will not exceed in the aggregate Ninety (90%) per cent. of the value of the labour and materials furnished and set in place.

Accompanying the tender shall be a detailed bill of quantities of all material and labour properly priced out which shall aggregate the contract price.

The lowest or any tender not necessarily accepted.

Envelopes containing tenders to be marked "Tenders for Plumbing Pipes and Fixtures" and addressed to the undersigned.

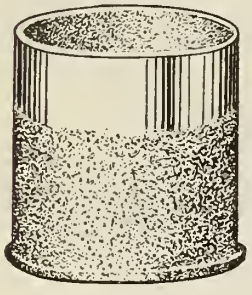
JOHN A. PEARSON, Architect.
J. O. MARCHAND, Associate.

Centre Block,
Parliament Buildings,
Ottawa.



We manufacture sheet lead in any com mercial weight per foot, and in any width up to 7′ 6″ to suit our patrons. Guaranteed uniform thickness and temper.

STRAIGHT BRASS FERRULES



True, even thickness, clean metal, free from sandholes, thoroughly dependable.

EASY WIPING SOLDER

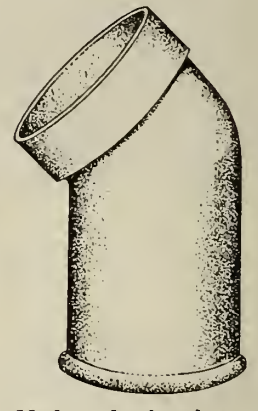


Wiping solder of various quality. None that is not the best value on the market. Easy Wiping is the plumbers' favorite.



Patent Soil or Waste Pipe in lengths of 8 feet

BENT BRASS FERRULES



Made of the best metal for the purpose, clean and easy to tin, and easy to wipe.

WE MAKE

Block Lead
Sheet Lead
Lead Pipe
and
Lead Wool



WE MAKE

Wiping Solder
Solder Nipples
Brass Ferrules
Bar Solder
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A full line of cast iron enamelware baths, lavatories, sinks, drain boards, and a splendid line of cast cement laundry tubs, and all necessary brass goods used by the trade.

Write us for prices. We are headquarters for most of the lines you use.

CATALOG "A" MAILED FREE.

THE CANADA METAL CO., LIMITED

TORONTO, CANADA

Col. MacLean was in Germany When War Broke Out

HOW he got out, what he saw, heard, learned and concluded, he tells in the August number of MACLEAN'S MAGAZINE. Colonel MacLean knows Europe thoroughly. He knows high-up men in all the great political and commercial capitals of Europe – diplomats, bankers and great merchants. These men told him freely and plainly many startling things about Germany and her intentions.

In a contribution of truly sensational interest, abounding in most startling facts, Colonel MacLean points out "The Dangers Ahead." His aim is to arouse Canadians out of their unwarranted confidence and out of their content. You will find in this article by Colonel MacLean strange, even shocking revelations, and things hard to believe—and you ought to read "The Dangers Ahead" in order that you may help in their avoidment by Canada and her people.

MacLean's for August Is a Midsummer Number

The August MACLEAN'S is excellently balanced, as you will see from these contents:

CONTENTS

The Dangers Ahead. By John Bayne MacLean.

The Menace of Canadian Titles. By Joseph Martin, M.P.P.

Rev. C. A. Eaton—A Canadian Who Speaks Out. By Beatrice Redpath.

Frenzied Fiction for the Dog Days—(Done by the Dipperful.) By Stephen Leacock.

The Human Side of Conscription. By H. F. Gadsby.

Winning the War in the Air. By Agnes C. Laut.

A Circus Story. By L. B. Yates.

Mam'selle Butterfly. By Arthur Beverly Baxter.

The Captain of the Susan Drew. By Jack London.

An Andy Doolin Yarn. By Hopkins Moorhouse.

A Detective Story. By Robert E. Pinkerton.

The Gun Brand. By Jas. B. Hendryx.

Canada's First Woman Member.

Economy in Preserving and Canning.

Women and Their Work—A New Department. Review of Reviews—Regular Department.

Yates who writes the Circus Story, was born in Hamilton. He wrote those stories about Paragon Pete and The Singin' Kid in the Saturday Evening Post.

Leacock is excessively humorous in his Dog Days Sketch, in which he talks about summering and simmering.

Miss Laut fancies that the war may be won by the birdmen, and if Uncle Sam produces 100,000 planes, she may be right.

Gadsby sits in the Press Gallery at Ottawa, and writes brilliantly always. His "Conscription" article is in order.

Pinkerton who writes the detective story, "Old Twilight," knows how to write this class of story.

By the way, Lord Northcliffe has promised an article for the September MACLEAN'S.

You can see that MACLEAN'S for August is just the right type for August.

At All News-Dealers 15 cents

THE BOILER TO SPECIFY

You take no chances when you specify

KING Hot Water Boilers and Radiators



because we guarantee every boiler to live up to the claims we make for them. We assist you to build up a lasting reputation that counts, when we supply you with our goods.

STEEL AND RADIATION, LIMITED

Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

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Classified Buyers Guide

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Air Line Systems.
C. A. Dunham Co., Ltd., Toronto.

Air Valves.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Asbestos Goods.
James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Joseph Breeden & Co., Ltd., Birmingham, England.
Canadian Brass Co., Ltd., Galt, Ont.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Limited, Galt.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Brass Pipe and Tube.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Dralners.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Closets.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., Ont.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.

Country Residence Equipments.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co. Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Damper Regulators.
W. E. Clark Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Ejectors, Steam.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

Ejectors for Sewage.
National Equipment Co., Ltd., Toronto.

Enamelware.
Amherst Foundry Co., Ltd., Amherst, N.S.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

Electric Pumping Machinery.
Canadian Machinery Co., Ltd., West Toronto.
Empire Mfg. Co., Ltd., London, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Fittings.
Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Flushometers.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Floor and Ceiling Plates.
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Beaton & Corbin Mfg. Co., Southington, Conn.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Gasoline Engines.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Gas Water Heaters.
Galt Brass Co., Ltd., Galt.
Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Rolf Heater Co., Columbus, Ohio.

Generators.
W. E. Clark & Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Heaters.
Lord & Burnham Co., Toronto.
Steel & Radiation, Ltd., Toronto.

Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Mixing Valves.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
Speakman Supply & Pipe Co., Wilmington, Del.

Monkey Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Oil Burners
National Rotary Oil Burner Co., Boston, Mass.

Oil Storage Systems.
National Equipment Co., Ltd., Toronto.

Packing.
Canadian Wolverine Co., Ltd., Chatham.

Packless Radiator Valves.
W. E. Clark & Co., Toronto.
Kerr Engine Works, Walkerville.

Pipe and Radiator Hangers.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.

Pipe, Black and Galvanized.
Canadian Tube & Iron Co., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Pipe Cutters.
Trimont Mfg. Co., Roxbury, Mass.

Pipe Joint Compounds.
Canadian Wolverine Co., Ltd., Chatham.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Pipe, Soil, and Fittings.
Anthes Foundry Co., Toronto and Winnipeg.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Toronto Hardware Mfg. Co., Toronto.

Pipe Threading Tools and Machinery.
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John Hall & Sons, Ltd., Brantford.
A. B. Jardine & Co., Hespeler.

Pipe Wrenches.
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Trimont Mfg. Co., Roxbury, Mass.

Porcelain Ware.
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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Pumps.
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C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
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Steel & Radiation, Ltd., Toronto.

Radiator Foot Rests.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,

Radiator Traps (Steam).
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Toronto Hardware Mfg. Co., Toronto.

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C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Steam Specialties.
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Dart Union Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.
Kerr Engine Co., Walkerville, Ont.
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Smoke Test Machines.
James Morrison Brass Mfg. Co., Ltd., Toronto.

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National Equipment Co., Ltd., Toronto.
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W. E. Clark & Co., Ltd., Toronto.

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James Morrison Brass Mfg. Co., Ltd., Toronto.

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Empire Mfg. Co., Ltd., London.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Trimont Mfg. Co., Roxbury, Mass.
Williams, J. H., & Co., Brooklyn, N.Y.

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Dart Union Co., Ltd., Toronto.

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C. A. Dunham Co., Ltd., Toronto.
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Vent Caps
Malcolm Co., Toronto.

Vitro Tanks.
Cluff Mfg. Co., Ltd., Toronto.

Vacuum Systems of Heating.
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C. A. Dunham Co., Ltd., Toronto.

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Canadian Machinery Co., Ltd., West Toronto.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Beaver Die Stocks

Full Thread at One Cut

with the

"Beaverette"

A Compact and Complete Tool

NO CHANGING OF DIES—NO BACKING OFF—NO LOOSE BUSHINGS. These are some of the advantages of the "Beaverette" not found in any other tools. Cuts from ⅛ to 12 inches.

One man can cut a 12-in. thread easily with our tool.

Beaver Pipe Cutters



Make a square, clean cut, and leave no burrs. There's less friction on hot water jobs and less wet steam on steam jobs when the Beaver square-end pipe cutters are used.

Manufactured by

The Borden-Canadian Co.
Toronto, Canada

"BEAVER"

Rolf Gas Water Heaters

No. 6, 7 and 81 Series



We make gas water heaters only, and because we devote our whole plant to this one line we are enabled to make better heaters at a lower cost.

THE ROLF HEATER MFG. COMPANY
Heater Experts
COLUMBUS - - OHIO
W. H. CUNNINGHAM, 98 Kingswood Road, TORONTO
Canadian Representative

WROUGHT PIPE

BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.
All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized
All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

Montreal Works: Lachine, Can.

MUTUAL BENEFIT CHATS. NO. 5

The chief accountant of a large firm which advertises in THE SANITARY ENGINEER, said to one of our staff the other day: "Your lessons on bookkeeping are the best along this line I have seen for many years." This man was not asked for his opinion, he gave it voluntarily. If these lessons are good enough to attract the attention of a man who understands bookkeeping from every angle, they must be what we are aiming to make them, namely, a help to the man in business. Mr. Sanitary Engineer, with overhead costs increasing by leaps and bounds, you cannot afford to be without a bookkeeping system. Subscribe to THE SANITARY ENGINEER and get the best at less than two cents per lesson.

Advantages in Using

Dart Unions

EASILY CONNECTED—
A ball-shaped joint that makes the connection so long as the nut can be started on its thread.

PERMANENTLY TIGHT JOINTS—
No deterioration of any kind at the joint, nor is the joint affected by expansion, contraction or vibration.

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The bronze to bronze non-corrosive joint and solid parts eliminate replacement. The union may be connected time after time without expense or bother.

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No up-keep cost, no replacement cost and no loss from leaks.

GUARANTEE—
We will replace 2 for 1 any union bearing our Trade-Mark, that does not give absolute satisfaction and fulfill our claim.

CUSTOMERS—
Are given a satisfaction that ensures you their future business.



ORDER FROM YOUR JOBBER

Manufactured by Dart Union Co., Limited, Toronto, Canada

KERR GATE VALVES



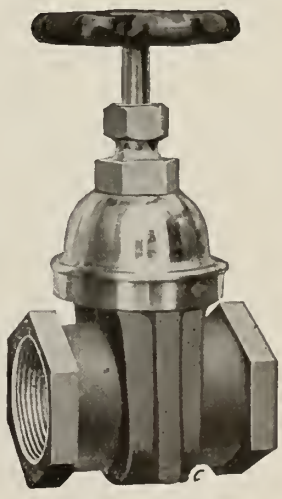
I. B. GATE

These Iron Body Gate Valves were designed and are made by US to meet YOUR demand for strong, substantial, interchangeable valves, with "nobby" appearance.

They meet the requirement and more. When they get us a customer they hold him.

Who in the Steamfitting trade has not heard of and used Kerr's (Weber) Brass Gate Valves? We say "Kerr's"—not the imitations. We make this valve of uniform material, and they stand up to the work given them, just as they always have. Some have tried others, but they came back to the tried and trusty old "Weber Gate" made by Kerr. What is a few cents on a valve, when you can get one like the genuine "Weber"?

Have you our Catalogue No. 5 ?
If not, we will mail you one.
A postal to-day will bring it.



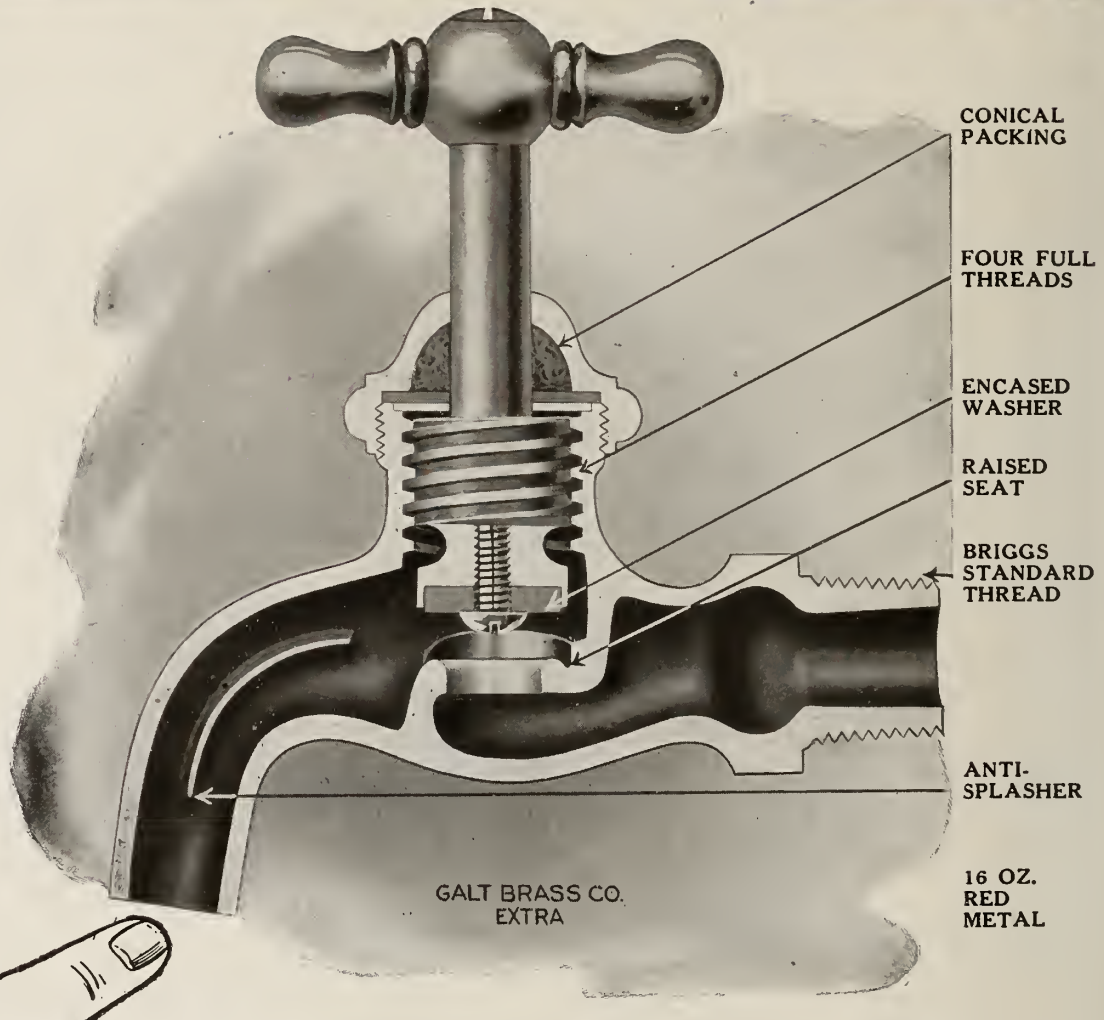
BRASS GATE

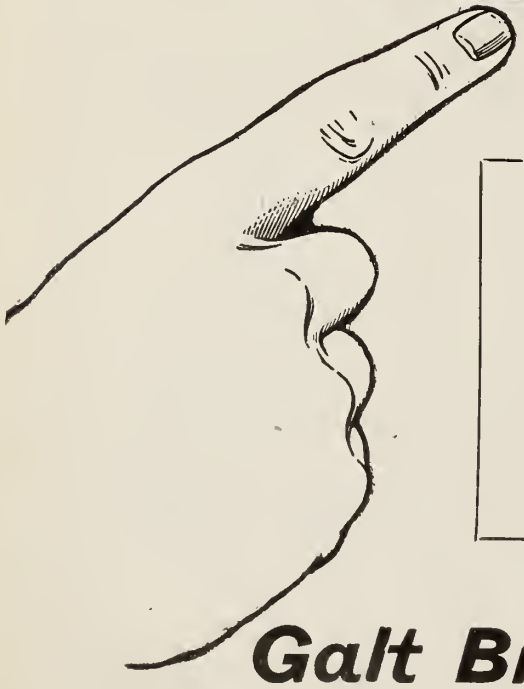
THE KERR ENGINE COMPANY, LIMITED

WALKERVILLE, ONTARIO

Registered **PERFECTO** Trade Mark

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, AUGUST 15, 1917 | No. 16

FILE COPY

EMPIRE

PNEUMATIC

Quality

WATER SYSTEMS

First

EMPIRE PNEUMATIC WATER SYSTEM OPERATED BY GASOLINE ENGINE.—This system is specially adapted to places requiring large quantities of water at intervals.

This pump can be operated by an electric motor having automatic Electric Switch and thus being made entirely automatic in operation.

The Engine with the Trouble left out.

We show here a Hopper Cooled Engine that will stay cooled. In manufacturing the Empire Engine, the first consideration is the best material and best workmanship, then comes simplicity, and this is the way we get the Engine with the trouble left out. These Engines are especially adapted for Farmers, Isolated Electric Lighting Plants, and Irrigating Plants.

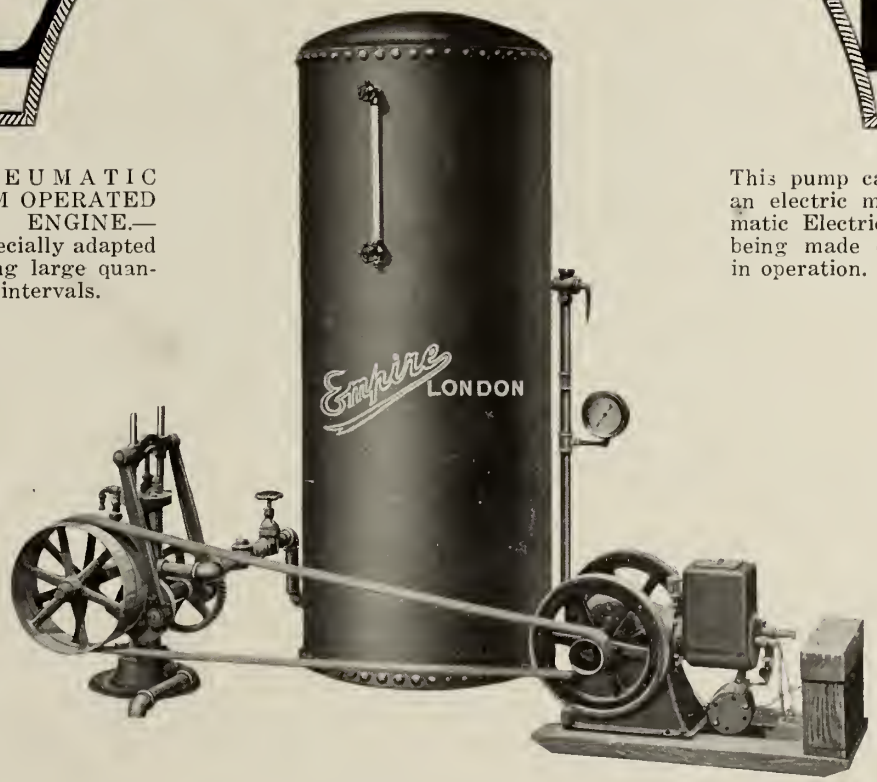


PLATE A1903

Empire Vertical Power

Hydro Pneumatic Pump for shallow or deep wells, with water-cooled air compressor.

Double discharge, backgeared 5 to 1 feet.

The special advantage of this style pump over an independent Air Compressor is that it admits just enough air at all times to keep the pressure tank in proper working condition, whereas, when separate Air Compressor is used, it is often overlooked until tank becomes water-logged.

The above pump, running at the rate of 40 strokes per minute, has a capacity of 360 gallons per hour. It can be made for either deep or shallow wells. The tank generally used has a total capacity of 420 gallons, which, allowing one-third space for air, will deliver 280 gallons of water with one pumping. The engine shown is a two H.P. being used for shallow well pumps and a 3 H.P. for deep well pumps.

The complete System includes: Tank, Pressure Gauge and Water Gauge, Pump, Gasoline Engine, two one-inch Gate Valves, one one-inch Check Valve, one ½-inch Compression Bibb, and one ¾-inch Stop and Waste.

WRITE US FOR FULL PARTICULARS

EMPIRE MANUFACTURING COMPANY, LIMITED

LONDON *TORONTO*

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A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for **BEAVER BRAND CAST IRON ENAMEL WARE**

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

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Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Making Good

Whatever the need for rubber may be, your selection of that need from the Dominion Rubber System products is a sure guarantee for the quality of the article you purchase.

Dominion Rubber System products are made for service. That is our *first* consideration. That is why they "make good" under the severest tests.

For service, value and economy, Dominion Rubber System products will easily be your *best buy*.

Write our nearest branch for prices of the rubber needs you require.

Canadian Consolidated Rubber Co.
Limited

Head Office - - MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

Readers Please Note Error

On page 6 in the July 16 issue of Sanitary Engineer, the publishers inserted an illustration that was not necessarily a trade marked line of W C Combination and take this opportunity of drawing the attention of our readers to the fact.

ALL B. O. T. COMBINATIONS BEAR THE TRADE MARK SHOWN BELOW



REGISTERED

the Trade-Mark to look for when buying

WATER CLOSET COMBINATIONS

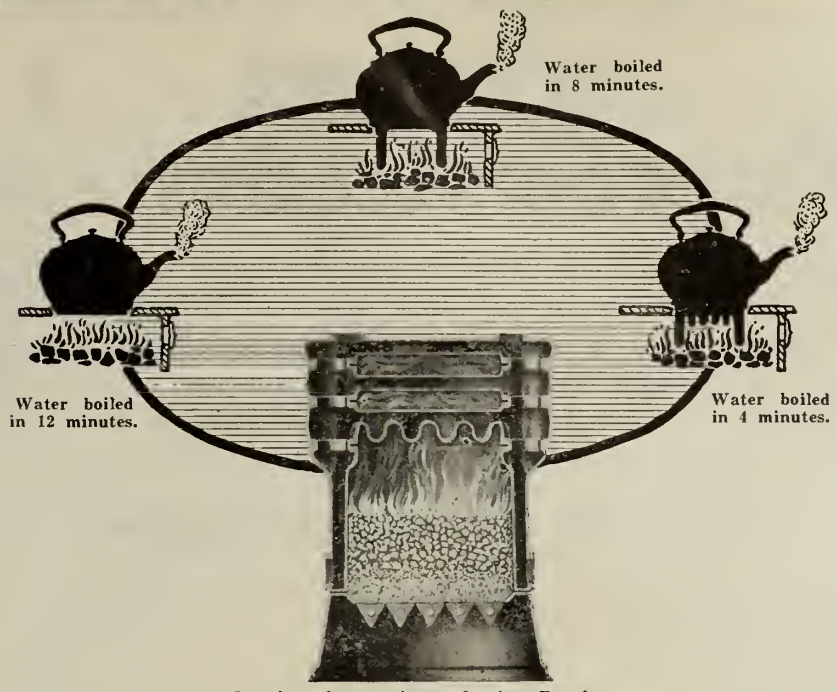
"Mr. Sanitary Engineer":---We wish you to bear in mind that every Wood Tank and every Wood or Blanco Seat sold by us is insured against all defects.

Look for the trade mark of quality. It is your insurance policy, and appears on both tank and seat.

CANADIAN BRASS COMPANY, LIMITED

GALT, ONTARIO

TORONTO BRANCH, 159 WEST RICHMOND STREET



Interior front view of the Burnham Boiler. Shows how it's built along the lines of the teakettle at the right.

Three Teakettles—The Lesson They Teach of Burnham Boiler Economy

FIRST, take that teakettle at the left. It's just an old-timey, flat-bottomed one. It takes 12 minutes to bring the water in it to a boil.

Now, note the teakettle at the top. It has hollow sides, or "legs," extending *down into the fire.* The same fire will boil the water in this kettle in 8 minutes.

Still better results are attained with the teakettle at the right. It not only has its "legs" extending down into the fire, but its bottom is *crimped up,* which *more than doubles* the amount of water surface space which the fire can directly heat. The same fire will boil the water in this kettle in four minutes; or *one-third* the time of the first kettle, and yet no more coal be burned.

To adapt the principle so convincingly presented in this third teakettle to the building of our boiler is just common-sense. We're strong for common-sense—so we did so.

Just how we did so, the interior front view of the Round Sectional Burnham Boiler at the bottom of the oval above shows.

Note how the water surfaces have been carried right *down around the fire;* note how the surface *directly above the fire* has been *crimped up,* more than doubling it.

Which explains why the Burnham Boiler will heat up houses so quickly on so little coal.

Sell the quick-heating Burnham Boiler.

Send for catalog.

Lord & Burnham Co., Limited

(Boiler Department)

Of Canada

Royal Bank Building, Toronto

Factory: St. Catharines, Ontario

Burnham Cosy Comfort Heat

BB

ONTARIO WIND ENGINE & PUMP CO. LIMITED
TORONTO

Water Service Systems

Our exhibits at the TORONTO and OTTAWA Exhibitions this year will include many different types of TORONTO Water Systems in operation. We want you to examine these outfits for yourself, so that you can form your own opinions. The result of your observation is sure to be favorable to us, because we use only the best materials, and employ only first-class mechanics.

This Is Your Invitation

to come to our exhibit, either at Toronto or Ottawa. We will be pleased to meet you, and to have the opportunity of displaying our goods for your approval.

Ontario Wind Engine & Pump Co., Limited

Head Office: TORONTO **Branches: Winnipeg, Montreal, Calgary**

GENUINE FULLER BALLS

WOLVERINE "Highest Grade" *WOLVERINE*

SIZES
3/8 in., 1/2 in., 9/16 in.,
5/8 in., 11/16 in., 3/4 in.,
13/16 in. and 1 in.

Blunt and Tapered Patterns

See Catalogue "C."



"Non-Splitting" Genuine Fuller Balls "Guaranteed" to stand any degree of hot or cold water.

Write for Prices.

Canadian Wolverine Co., Ltd., Chatham, Ont.

ONE MAN DOES WORK OF TWO

WITH THE

"Jardine" and "Toledo" Pipe-Threading Tools



"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of "**JARDINE**" OR "**TOLEDO**" DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear, too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

WRITE FOR CATALOG OF COMPLETE INFORMATION.

A. B. JARDINE & CO.

HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.

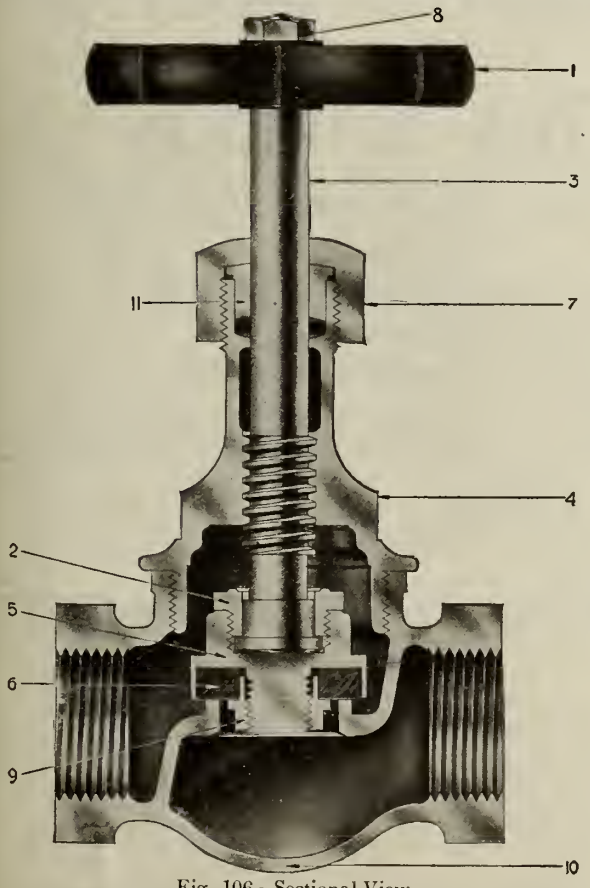


Fig. 106—Sectional View

For use under cold water service there are no valves quite as satisfactory as

Jenkins Bros.'

Globe *and* Angle Valves

fitted with Jenkins' No. 93 Discs

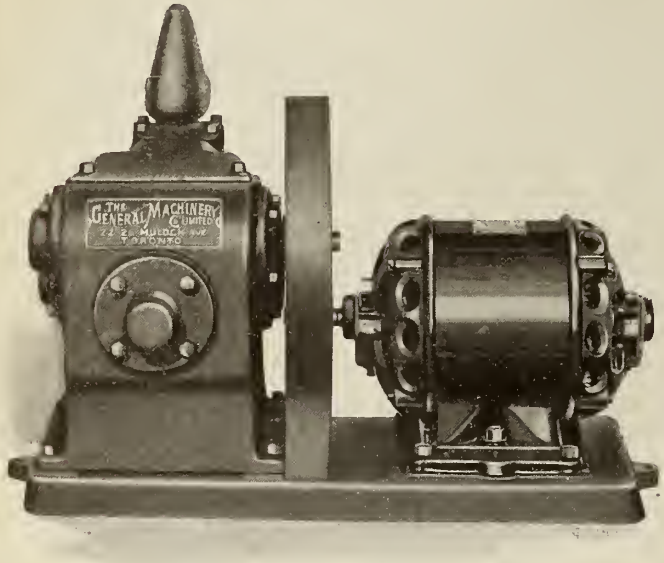
The flexibility of the disc assures a perfectly tight seat and the composition is tough, non-corrosive and durable.

WRITE FOR CATALOGUE NO. 8.

JENKINS BROS. Limited

103 ST. REMI STREET, MONTREAL

G. M. C. WATER SYSTEMS with INVINCIBLE PUMPS

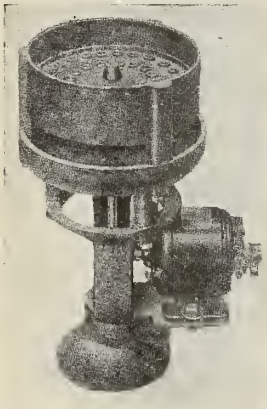


Our "Low Down Construction" permits of direct connection in a practical and workmanlike manner.

The most quiet running direct connected outfit manufactured.

THE GENERAL MACHINERY CO.
LIMITED

24 MULOCK AVE. - TORONTO, ONT.



NEW DIFFERENT BETTER

The cost of coal is a serious problem to-day. Your customers have all tried to solve it and failed. We have tried and succeeded.

ROTARY OIL BURNER

is the result of our labors. It burns fuel, oil, or kerosene. Can be installed by any plumber. Works in connection with present heater. Installed in the fire-box, gives a terrific fire in a few seconds. Can be turned off instantly when not needed. No trouble to take care of. Big profits for the plumber and an unlimited field.

NATIONAL ROTARY OIL BURNER COMPANY
235 Congress Street, BOSTON, MASS.
PROGRESSIVE REPRESENTATIVES WANTED EVERYWHERE.

WE SPECIALIZE

In the Manufacture of

CAST IRON SOIL PIPE and FITTINGS

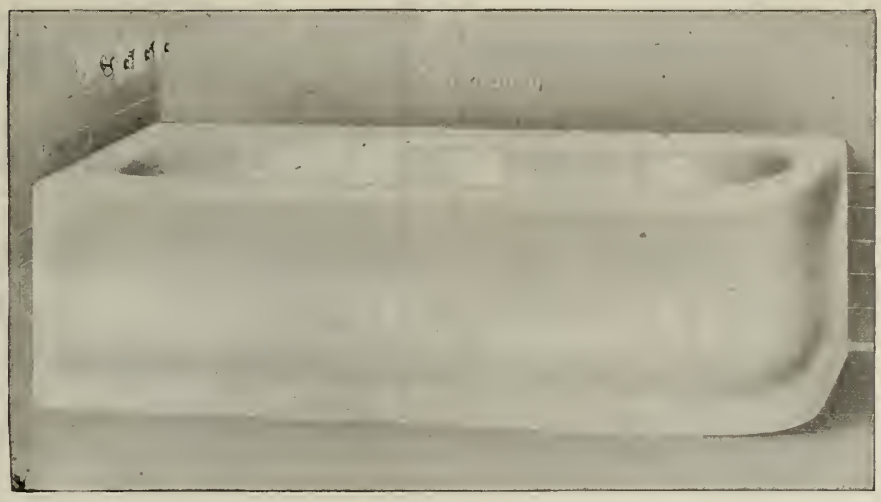
as well as

GALVANIZED RANGE BOILERS AND EXPANSION TANKS
FOR HEATING SYSTEMS

TORONTO HARDWARE MFG. CO., LIMITED

"Standard"
"Perfection" Built-In Baths

Made in One Piece Enamelled All Over



These Baths represent the last word in design and finish, and are made to build into Right or Left Hand Corner or into a Recess.

The "Perfection" Built-in Bath is only 17½ inches high, therefore convenient. It builds into walls and floors, the absence of all dust-collecting cracks and corners, meaning bathroom sanitation.

Made in 5 and 5½ foot sizes.

Illustrations on request.

Write the nearest dealer.

Standard Sanitary Mfg. Co.
Limited

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Toronto Store:
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Winnipeg:
76 Lombard Street

Hamilton Store:
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Montreal:
4 Beaver Hall Square

Vancouver:
202 Crown Building

"MADE IN CANADA"

"B & C"

COMBINATION

Floor and Ceiling

PLATES



No. 10 Steel
3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

Send for catalog of complete line.

MANUFACTURED EXCLUSIVELY BY THE

Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:

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THE CRANDON NO. 42 TANK TYPE THERMOSTAT



is a thoroughly reliable automatic control for hot water.

The thermostatic bar comes in direct contact with heating surface of tank or pipe, insuring perfect control.

Attractive discounts.

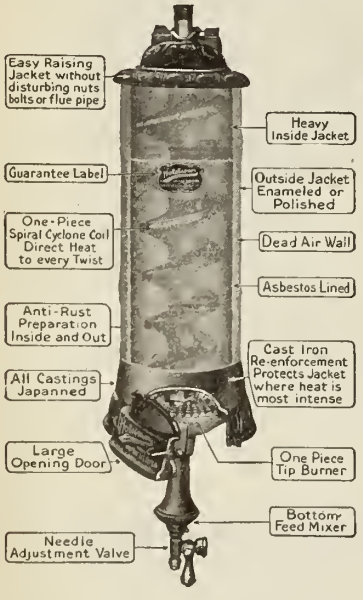
Write for booklet to-day.

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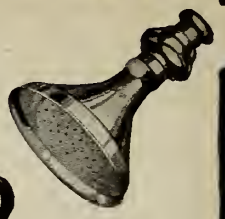
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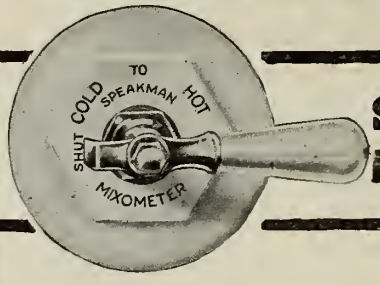
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MACLEAN'S FOR SEPTEMBER

is a magazine of the very best type and rank. It is made for Canadians, and so has a value and appeal to Canadians possessed by no other magazine in the world. MACLEAN'S circulation is getting greater each month. It is now 50% larger than a year ago. The inference is inevitable.

Northcliffe

Lord Northcliffe will be a contributor to the September MACLEAN'S. The general theme of his article will be Canada's position at the present time in relation to the war and to the Empire afterwards. Be sure to read what the brilliant and dominant man has to say about our country. Get an outsider's viewpoint.

MacLean

John Bayne MacLean, publisher, editor, publicist, clear-seeing and far-seeing, has another strong article in the September MACLEAN'S. Colonel MacLean has proved himself to be as clear-sighted as Kitchener in many matters pertaining to the present war; and he is doing a needed work now in THE FINANCIAL POST and other newspapers, to arouse Canadians to a proper sense of the perils that lie ahead.

Ronald

Another smuggling revelation!

A certain Canadian town offered a big bonus to a factory. An American supplied the desired factory, smuggled into Canada the whole plant required,—and was afterwards found out and brought to book. J. D. Ronald tells the whole amazing story in the September MACLEAN'S. Mr. Ronald is contributing to MACLEAN'S a series of Canadian "inside" smuggling stories—true ones. This is great stuff.

Leacock and Laut

Stephen Leacock and Miss Agnes C. Laut are contributors as usual to the September MACLEAN'S. Leacock's humor is bubbling, sparkling and refreshing—like spring water. Miss Laut provides another of her well-informed vigorous, and revealing articles on a phase of the war in relation to Canada and the United States. Miss Laut makes us think and wonder!

Jacobs and McGrath

W. W. Jacobs contributes one of his inimitable short stories to the September MACLEAN'S. "Their Wives Went Along." Harold McGrath, world famous story-writer, who wrote "The Man on the Box," provides a complete novelette. It is a story of adventure and mystery.

Allenson and Moorhouse

A. C. Allenson contributes a short story, "A Flutter in Diamonds;" and Hopkins Moorhouse, "Their Tents like the Arabs." These two men are Canadians—winning fame, and adding lustre to Canada's record for producing short story writers of the first-class.

Hendryx

James B. Hendryx's serial, "The Gun Brand," continues in the September MACLEAN'S. A great story of the Canadian Northwest. The Movie-makers are filming Hendryx's work. So you can be sure that he's writing the right sort of stuff.

Women and Their Work

This is the title of a new department in MACLEAN'S. In the September issue, this department will contain:

Reducing my household cost.

The Care of the Child—an article by Dr. George E. Smith.

A sketch of Mrs. W. M. Davidson, a prominent Western woman, engaged with her husband in editing the Calgary Albertan.

Cooking the Cheaper Cuts,—an article on economy in the kitchen.

This new department will prove of first-class interest to all women.

Review of Reviews

One of the best liked and most valuable features of MACLEAN'S MAGAZINE is its Review of Reviews Department where the best and most significant articles appearing in current literature are condensed for the busy reader, and for the one who wants to know what other magazines are printing. Here one gets a cross-section of the world's best thought.

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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, AUGUST 15, 1917 No. 16

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SANITARY ENGINEER

VOL. XI AUGUST 15, 1917 No. 16

To Avoid Root Growth in House Sewers

An Advance Made in Pasadena, Cal.—Iron Pipe Now Used Throughout the Whole Length of House Drain From Stack to Main Sewer — Canadian Cities Would Save Thousands of Dollars by Following This Splendid Example.

WHILE the majority of municipalities prohibit vitrified stoneware sewer pipe in cellar bottoms and compel the use of cast iron pipe inside the foundations walls, and to a distance of from 6 to 10 feet outside of the foundation walls, few have been able to pass and enforce an ordinance prohibiting the sewer. Pasadena, Cal., however, recently passed an ordinance prohibiting the use of any other than cast iron pipe for the entire house drain, and prohibiting also any replacement of stoneware pipe where it has been necessary to repair a clogged or leaky drain. This ordinance is being rigidly enforced.

The accompanying photographs show the need for the law in this respect more clearly than any argument that could be advanced. Fig. 1 shows the root growth in a ditch where a clogged stoneware house drain had to be actually broken out to remove the obstruction, and shows the drain relaid with cast iron pipe with caulked joints. The fallacy of relaying stoneware pipe in this ditch is obvious, as the roots would soon force an entrance through the cement joints, or raise the pipe and break the joints in their quest for moisture, and soon render the drain useless. I investigated one case where the plumber who was replacing a clogged stoneware drain with cast iron told me that he had laid a new drain of stoneware pipe on the same job less than a year before.



Fig. 1. View taken at bottom of trench shows countless number of roots. These roots disintegrate vitrified house sewers and it is necessary to relay the entire line with cast iron pipe.

Fig. 2 shows a stoneware drain removed, where the roots had sheared the pipe at the joint and had entered and grown both ways until the drain was completely clogged.

Fig. 3 shows an instance where the root obstruction extended through the parkway into the street to the main sewer. The difference in first cost between cast iron pipe and stoneware pipe would go a short way toward paying for this destruction of lawns, steet pavement, labor and material to put the drain in use.

Fig. 4 shows two sections of a removed stoneware drain that was solid with root growth, and the dark mass to the right of them is a section of the root removed.

In talking with several plumbing contractors regarding the cost of removing and replacing these clogged drains, I found that the prices ranged from 50 cents per foot to 85 cents per foot, including the replacement with cast iron pipe. Taking twenty jobs of removing clogged stoneware drains and replacing them with cast iron, I found that they averaged approximately $52. Figure the actual difference in cost of the two kinds of pipe, and see what the difference would have been in the first place. In most cases it is impossible to estimate beforehand the cost of remedying such trouble, as it is impossible to tell, until the drain is dug up, how far the root growth extends. In many cases the roots enter the drain in the yard and extend to the main sewer in the street, nec-

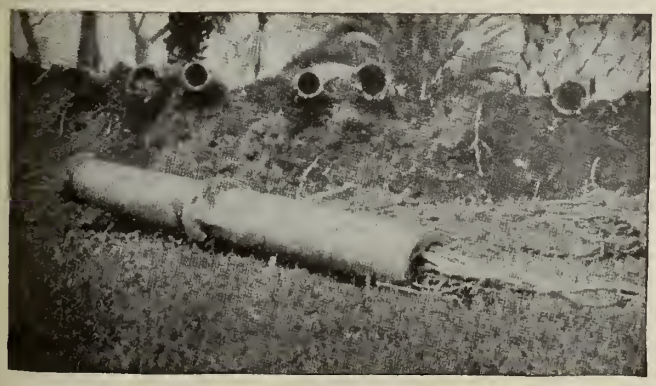


Fig. 2. Photograph of a root many feet in length. These roots enter at one of the cement joints and grow both directions in the house sewer.



Fig. 3. Usually the house sewer extends into or entirely across the paved street. It becomes necessary to replace the earthenware drains at great cost and annoyance to the property owner.

essitating taking up the pavement and, in some cases where the sewer is on the opposite side of the street on car-line streets, of tunneling under the tracks.

The advantages of cast iron for house drains over vitrified stoneware pipe is so well established and recognized by all sanitary engineers that it is unnecessary to dwell at length upon the comparison. A few of the most salient points, however, may be informing to the layman reader.

Cemented joints of vitrified pipe cannot be made tight to withstand a pressure test, settling, expansion and contraction, tamping in and refilling the ditch all disturb the joint. It is impossible to make a tight joint unless they are bedded in concrete, and, when the joint offers too much resistance, the roots may shear the joint at the bell.



Fig. 4. Roots find a very favorable environment in vicinity of earthenware house sewers. The roots will within a very short time fill the bore of the drain, and may even expand to such extent that the pipe is broken by internal pressure.

Roots crossing drains will raise or depress the pipe and start the joints, making an opening through which the roots in quest of moisture readily enter and grow prodigiously.

Cast iron pipe with joints caulked with oakum and molten lead can be made tight and will withstand a pressure test. A line of cast iron drain will offer more resistance to root pressure and can be thrown out of alignment without breaking the joints. Any argument against cast iron pipe for house drains on account of the increasing use of disinfectants and washing powders, acids and alkalies, etc., is met by the absence of deterioration in the cast iron pipe taken out of the Astor House, N.Y., after 80 years' service.

New Toronto Plumbing By-law No. 131

This By-law is One of the Latest to Come to Our Notice—It Will Prove a Boon to This New Town and go a Long Way Towards Eliminating Many of the Evils Which Older Cities and Towns Are Heir to.

Continued from last issue.

Recessed and Threaded Drainage Fittings

33. All fittings used for soil or waste pipes in connection with wrought iron shall be extra heavy galvanized cast iron, or malleable iron, recessed and threaded drainage fittings. The burr formed by cutting the wrought iron pipe shall be carefully reamed out and pipes left full bore.

Iron Floor Rests

34. Vertical lines of soil, waste, or other pipes inside of buildings shall be provided with strong wrought iron floor rests at intervals of every second floor.

Prohibited Fittings

35. No double hubs, straight crosses, double "Ts" or double "T-Ys" shall be used in any soil or waste pipe below any fixture; no branch fitting other than a full "Y" or "Y" and ⅛ bend shall be used on any soil or waste pipe running in a horizontal direction.

Uniformity of Material

36. When a system is to be installed for soil and waste pipe, it must be either entire galvanized wrought iron or entire cast iron, but must not be part galvanized wrought iron and part cast iron.

Bath, Etc., Waste Not to Connect to Closet Bend

37. Waste pipes from bath and basin or other fixture will not be allowed to connect to water closet bend, but must have a separate fitting to receive the same.

Waste Pipe Sizes

38. No waste pipe from any plumbing fixture shall be less than inside diameter of its trap.

The Size of Traps

39. The size of traps for a given fixture shall never be less than the following inside diameter:

Water closets	3 inches
Slop sink	2 inches
Laundry tubs, 1 to 3 considered one fixture	1½ inches
Kitchen sink	1½ inches
Pantry	1½ inches
Wash Basin	1¼ inches
Bath tubs	1½ inches
Shower bath	2 inches
Sitz bath	1½ inches
Drinking fountain	1¼ inches

Traps and Vents

40. All drains and plumbing fixtures of every house or other buildings shall be provided with sufficient traps and vents to prevent gas from the sewer, drain, or waste pipes from escaping into any apartment; and each such fixture shall have its own trap with sufficient vent, said trap to be placed directly under and as close as possible to fixture.

One Trap to Fixture

41. No fixture shall drain through more than one trap (main trap excepted), the vent to be not less than one size smaller than trap, and no vent of less than one and one-quarter inches in diameter.

Vents to Increase at Roof—Continuous Vent

42. No trap vent pipe shall be less than three inches inside diameter where it passes through the roof or outside wall, and all vent pipes must continue to rise after leaving the trap, and pass out through the roof, or connect with soil pipe above the highest fixture. Traps for basins and sinks, when ½ "S" or "P" traps are used, may be vented by a continuous vent, if centre of waste opening is not more than 12 inches from face to finished plaster, or wall, which they pass through or along, measured at right angles from face of wall. In all other cases location of trap vent will be governed by paragraph (c) of this clause.

Off a Trap or Lead Bend Under a Floor the Shortest Way.

(a) No trap vent will be allowed to connect to another vent below a point level with top of fixture for which it is used.

(b) A vent taken off a trap or lead bend under a floor shall be extended in the shortest way to the nearest suitable wall or partition, and then extended vertically as high as required above floor line.

No Slip or Washer Joint Shall Be Allowed—Crown Venting.

(c) No slip or washer joint shall be allowed on sewer side of any trap or any vent pipe. Trap vents in all cases (W.Cs. excepted) must be taken off discharge side of trap, or waste pipe, as shown in diagram. Crown venting will not be permitted. No wrought iron vents will be allowed below top of cellar floor, or to be buried under any earth.

Terminus

43. The rules for soil pipe terminus, as hereinbefore mentioned, shall govern said vent pipe.

Brass Pipe

44. No brass pipe used for waste or vent pipes shall be less than No. 19 Imperial gauge in thickness, and all brass pipe and fittings must be properly tapped and threaded.

Size of Closet Vents

45. Vents for water closet traps shall

be 2 inches for a length of 25 feet, and for a greater length, 3 inches.

Vent Pipe Stacks Must Be Increased

46. Vent pipe stacks must be increased one size after passing through four stories, and keep on increasing one size for each succeeding four stories.

Of Brass, Lead, Cast Iron, Etc.

47. Trap vents must be of brass, lead, cast iron, or galvanized wrought iron, with brass galvanized cast malleable iron or brass fittings.

Size of Closet Vents

48. Closet vents, into which other vents are connected, shall be three inches in diameter. When the vent pipes combine, they must be increased in size.

Local Ventilation

49. All water closets (slop sinks, when in separate compartments), and urinals, must be supplied with three inch local ventilation pipe having an area equal to that of a three inch round pipe, and connected to a heated flue; when a number of pipes combine, the main or trunk pipe must be increased proportionately.

Lead Pipes Waste or Vent

50. No lead, waste or vent pipes shall weigh less than the following, when used in any building:

1¼ inches inside diameter, 7 lbs. per yard.
1½ inches inside diameter, 8 lbs. per yard.
2 inches inside diameter, 10½ lbs. per yard.
2½ inches inside diameter, 13½ lbs. per yard.
3 inches inside diameter, 16½ lbs. per yard.
4 inches inside diameter, 24 lbs. per yard.

Lead Pipes for Water Works Pressure

51. For water works pressure, no lead pipe shall weigh less than the following:

⅜ inch internal diameter, 4 lbs. per lineal yard.
½ inch internal diameter, 6 lbs. per lineal yard.
⅝ inch internal diameter, 8 lbs. per lineal yard.
¾ inch internal diameter, 10 lbs. per lineal yard.
1 inch internal diameter, 13 lbs. per lineal yard.

Laying Water Supply Pipes

52. In all cases where water pipes are placed under ground they shall be of lead up to and including one inch inside diameter, and of the weight per lineal yard as specified in section 51 of this by-law.

Wiped Joints

53. All lead pipes shall have proper wipe joints.

Brass Pipes

54. Brass pipes used for water works pressure shall be standard wrought iron sizes and properly threaded. All fittings used for water works pressure must be proper threaded fittings; no slip joints will be allowed.

Grade Water Pipes to Stop Cock

55. All water supply pipes shall be laid with due regard to danger from freezing, and when outside of building they must be at least five feet below finished grade, and must not be placed back of plaster on outside walls of building, and shall be properly laid and graded with a fall to a stop and waste cock placed under floor in the cellar, or other convenient place, where they can be entirely drained off. Each consumer in a tenement building shall be supplied with a separate stop and waste cock on the service pipe inside the building unless the same is metered.

Connection Between Lead and Iron Pipes

56. Every connection between lead and iron pipes shall be made with brass thimbles, ferrules, solder nipples, or ground in unions, having properly wiped joints, and the ferrules shall be properly gasketted, leaded and caulked into the said pipe.

Ferrules

57. Brass thimbles, ferrules or solder nipples must not be wiped into closet bend or pipe of trap when used for venting same. All brass thimbles shall be increased in size at the top so that the lead pipe will enter full size.

Ferrules Shall Weigh

58. Ferrules for four-inch pipe shall weigh not less than 2½ lbs., for three inch pipe not less than 1¾ lbs., and for two inch pipe not less than 1½ lbs., ferrule must not be less than four inches in length.

Brass Flange or Closet Connection

59. Where the trap to closets is above the floor, the connection of the same with the soil pipe shall be made with lead bend or lead pipe and cast brass floor flange with gasket of rubber or asbestos, said brass flange to be not less than three-sixteenths of an inch thick.

60. No closet, or other convenience, which allows the escape into the house of air or gas from any part of it, from the drain or soil pipe connected with it, or which allows any accummulation of filth in or about it, shall be fitted up or used.

Self-Closing Cocks to Be Used in Water Closets

61. No arrangements shall be made for supplying water closets or urinals, except by self-closing cocks, unless when water is supplied by meter; and no arrangements shall be made for cleaning water closets or privy vaults by waste pipes from wash basins or sinks or other improper means; but they shall be fitted up with the proper fixtures and appurtenances belonging to them respectively. No copper lining of tank for a water closet shall be lighter than 10 ounces to the square foot, and weight must be stamped on lining in conspicuous and accessible position. Sheet galvanized iron shall not be allowed.

Water Closet in Direct Communication With the External Air.

62. No person shall locate or cause to be located any water closet in any sleeping room, or in any room, apartment or vault which is not in direct communication with the external air by means of a window or air space having an area of at least two (2) square feet, or vertical air shaft having an area of two (2) square feet for the first storey and increased ten per cent. for each storey it passes through.

Drains Not to Be Covered Until Inspected—Water Test and Smoke Test

63. The Engineer shall be notified when any work is ready for inspection and all works must be left uncovered and convenient for examination until inspected and approved of, and when approved of, a marker shall be placed in a suitable position. The inspection shall be made within two working days after receipt of notice (notice filed after 12 o'clock noon shall take date from the day following). When the soil is of such a nature that it cannot be left open for the two days, the inspection shall be made forthwith. The Engineer, or the inspector appointed by him, may require either a water or smoke test, which test shall be made by the party whose work is being inspected; and the result of every inspection shall be recorded in the office of the Engineer. If the work is not found satisfactory after being tested, two days' notice shall be given to complete the same, and if the work is not made satisfactory within that time, the penalty prescribed by this by-law may be enforced herewith.

The Smoke Test and Certificate

64. The smoke test shall in all cases be applied to finished plumbing work in the presence of the Engineer or inspector appointed for that purpose, by the master plumber or workman who is doing the plumbing work, before he, or they, hand over the plumbing work to the owner, or his agent, and no plumbing work shall be considered complete which has not had a smoke test applied and found tight; for the purpose of this clause plumbing work shall be considered finished when all the fixtures are fixed in their place. When work is found tight and satisfactory, the plumber shall receive a certificate for same.

Shutting Off Street Stop Cocks Connected With the Water Works

65. No person shall be allowed—without first having obtained a permit from the Waterworks Department—to open or shut off the street stop cock connected with the service, supplying any premises or buildings, unless in case of urgent necessity to prevent loss or damage from flooding, or when a plumber requires to do so in order to make necessary repairs or to test his work, and in every such case he shall leave the stop cock as he found the same, and any person who shall commit any damage or injury to any stop cock in the service pipes of the Waterworks shall be liable for the amount of such damage.

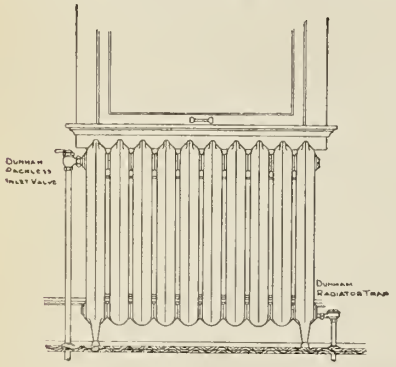
(Continued on page 29.)

Steam Traps, and How They Operate

Heating Engineers Will be Interested in This Series of Articles Which, After Describing Some of the Most Effective Radiator Traps, and the Tilt Trap, Will Deal With the Condensation Return Trap, Etc.

STEAM TRAPS—I.

IN most cases where steam is subject to condensation as in engines, pipes and various kinds of apparatus for power or heating, it is necessary to provide means whereby the water of condensation may be removed without any loss of steam. The device which accomplishes this is known as a steam trap, and consists of a valve automatically operated by suitable mechanism, which in turn is controlled either by the weight or volume of



Installation of Dunham Radiator Trap.

water passing through the trap, or by the difference in temperature between the water and the steam.

The three principal types of traps in common use are expansion, float and bucket traps. Each of these types is made with numerous variations of construction. As will be understood, expansion traps operate as a direct result of temperature change, while float and bucket traps depend on the action of the water either by displacement in the float type or weight in the bucket type. Various modifications of each type are obtainable for different pressures, but contrary to expectation, low pressure traps have a higher percentage of failures than traps built for high pressures.

In selecting a steam trap for any particular duty, every effort should be made to ascertain the probable load with some degree of accuracy. Two lengths of pipe or two pieces of apparatus in different parts of the same plant may have very different rates of condensation unless every condition be exactly duplicated in each installation. As condensation is caused by loss of heat, the rate of condensation for any one pipe or heating system will depend on the pressure, manner of operation, and exposure so that the ratio of condensation per lineal foot may easily vary from a few ounces of water per hour to as much as thirty-five or forty ounces. Bearing these conditions in mind, it is well to provide a trap of sufficient capacity to take care of the worst conditions liable to occur.

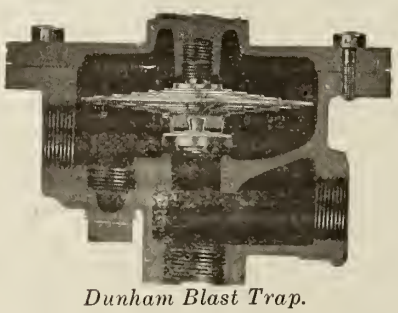
The size of the valve orifice is an all important feature, and should be specified whenever conditions permit. Orifices are frequently much smaller than the pipe connection size, and when small enough to prevent the passage of grit or scale, cause trouble due to the valve not being able to seat properly, with resultant leakage of steam and wire-drawing troubles. Trouble is also liable to occur when the water arrives in irregular quantities, which overload the trap temporarily, although the total water per hour may be well within the trap's capacity. See, therefore, that the actual maximum capacity is equal to this maximum temporary load.

Low Pressure Traps

The development of the low pressure trap has been almost entirely in conjunction with vacuum steam heating. Vacuum heating was conceived when the effort was first made to utilize exhaust steam from engines, etc., for heating purposes. It was a well known fact that as much as 90 per cent. of the original heat contained in the steam before expansion took place in the engine still remained in the exhaust steam emitted from the engine cylinder.

There were many obstacles to overcome to reach the present-day efficiency of vacuum heating. First—It was necessary to transmit this exhaust steam to the various radiators and steam condensing units without producing back pressure upon the engine pistons. That meant that friction had to be removed. It meant that circulation must be induced by means other than by the engine itself. The idea was then conceived to suck the steam away from the engine and into the different radiating units. This was accomplished by means of the steam vacuum pump, the exhaust of the vacuum pump itself being carried directly into the same exhaust piping system as that of the engine.

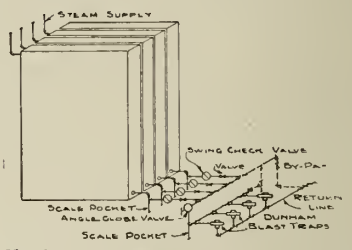
The application of the vacuum pump called for other vital improvements, the



Dunham Blast Trap.

most important of which was providing some suitable device on the return end of the radiator to keep the steam from blowing directly through into the return piping system, for this caused short-circuiting of steam through radiators in the direct path of engine to vacuum pump, and the other radiators would consequently air-bind and be very inefficient.

It was thus found after years of experimenting with hand regulated devices on the return of the radiators, with semi-automatic devices, etc., that the real success of the vacuum steam heating system depended almost entirely upon the correct selection of the trap to perform the function of releasing the water and air from



Installation of Dunham Traps on Blast Coil Heater.

the radiators and closing off tight against steam.

The trap must be of simple construction, must be automatic over a wide range of temperature so as to close off for steam and open for air and water—whether the steam pressure in the heating system be 10 or 15 in., of vacuum or 5 or 10 lbs. of gauge pressure.

At the present time it is well understood that this is the real vital factor—that low pressure traps on vacuum heating must be capable of working automatically on this wide range, yet at the same time be capable of passing foreign matter easily and continuously from the radiator without clogging up.

The thermostatic type of trap is one of the most widely used traps for vacuum heating of any of the various types offered to-day.

Dunham Radiator Trap

This trap is commonly known as the hollow, corrugated, thermostatic disc type. The trap body and cover is made entirely of brass and is so simply constructed that the water from the radiator has a gradual and direct flow to the opening in the centre of the trap body which leads to the return pipe. Directly over this opening is the only movable part of the trap. It is the member from which the trap derives its name—a hollow, corrugated, thermostatic disc, which is anchored rigidly to the cover of the trap. The corrugations in the disc add to the strength and the large diameter of the disc provides the maximum expansion of the disc with minimum strain per unit of area, with correspondingly long life.

The disc member contains a combination of volatile liquids which are hermeti-

cally sealed within and indefinitely retain their latent power of expanding and contracting in response to the effect of temperature. The disc is in contact with the steam and is subject to the same conditions that obtain within the heating fixture itself, an important factor in vacuum heating. On the lower portion of the disc is the flat valve which when steam surrounds the disc, seats on a flat surface of liberal area. The seat itself is raised slightly and this intercepts foreign matter, which usually collects around the raised seat until the trap opens, when all dirt and sediment is flushed through the discharge opening of the trap into the return pipe.

The disc forces the valves against its seat with a pressure of approximately 15 pounds which is sufficient to break up pieces of scale that might attempt to pass the trap. The large flat valve and seat admit of performing this severe service without injury to the seat, such as might happen to devices which use an otherwise sharp edge seat.

The disc member is made of a special phosphor bronze, and the same general design has been used by this company since the trap first appeared on the market some twelve years ago.

Dunham traps are made in the following sizes: ½ in. pipe connection, No. 1 size for 100 sq. ft. radiation; ½ in. pipe connection, No. 2 size for 350 sq. ft. radiation, the manner of installation being shown in accompanying illustrations.

The Dunham Blast Trap is constructed along the same lines as the radiator traps, except that it has an iron body. It is commonly used for removing air and condensation from steam mains or from blast heater coils.

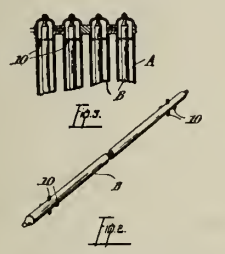
The ¾ in. Dunham blast trap has a capacity for handling 1,500 square feet of direct radiation, and the 1 in. blast trap has a capacity for handling 3,000 square feet of direct radiation, or equivalent, a sectional view shown herewith illustrates the method of application to blast coil heaters where exhaust steam is used in conjunction with a vacuum system.

New Canadian Patents

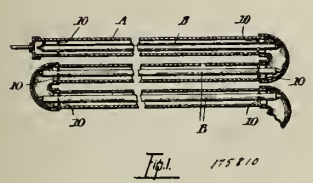
No. 175,810.

Edward Armstrong Mason, St. John, New Brunswick, Canada, 20th March, 1917; 6 years. Filed 20th May, 1915. Receipt No. 252,020.

Claim.—The combination with a radiator, of a vacuum chamber having integ-



No. 175,810. Radiator.



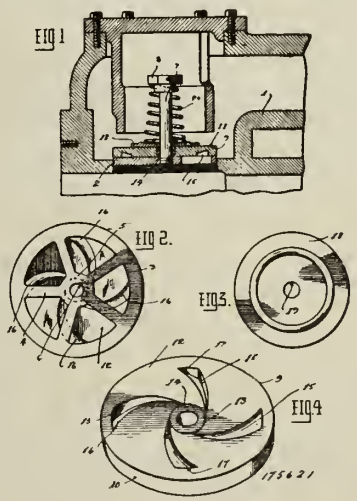
ral spiders near the end thereof to engage with the inner face of the radiator and concentrically locate the vacuum chamber therein, substantially as described.

No. 175,621.

William H. Worden, Cadillac, and Clarence E. Curtiss, Grand Rapids, both in Michigan, U.S.A., co-inventors, 13th March, 1917; 6 years. Filed 30th November, 1916. Receipt No. 272,617.

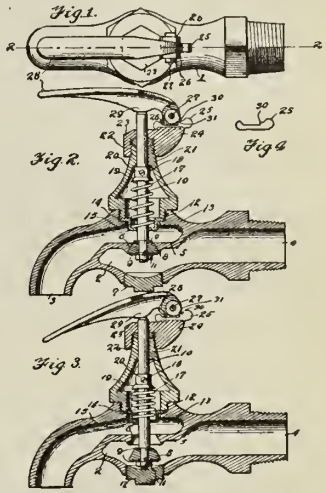
Claim.—1. In a pump valve of the class described, the combination of a valve seat having inwardly extending spiders, a body carried by said spiders, a vertical bolt carried by said body, a valve member positioned upon said seat, said valve member being reciprocally mounted upon said bolt, means for yieldably holding said valve member upon said seat, said valve member having a flat lower face so as to fit evenly upon said seat, said valve member having a plurality of sockets formed in its lower surface, said pockets being curved throughout their entire length, each socket having a vertical wall and also a slanting wall, said slanting wall extending from the surface of said valve member to the inner portion of said vertical wall whereby when water passes through said valve it will be deflected by said slanting walls against said vertical walls, whereby as the water lifts said valve member from said seat said valve member will be rotated.

2. In a pump valve, the combination of a seat, a disc-like valve member positioned upon said seat, means for holding said valve member in a central position above said seat, said valve member having a plurality of sockets formed therein, said sockets increasing in size toward the outer end thereof, each socket ex-



No. 175,621. Pump Valve.

tending inwardly from a point adjacent the periphery of said valve member, and having a vertical wall curved throughout its entire length, a slanting wall extending from the surface of said valve member to the inner portion of said vertical wall, a substantially straight wall extending from said slanting wall to said vertical walls at their outer ends, said slanting walls being adapted to direct



No. 175,909. Faucet.

water passing through said valve whereby the water will be deflected by said slanting walls against said vertical and straight walls, whereby said valve member will be rotated as it is lifted from said valve seat.

No. 175,909.

Charles D. Angelo, and Lawrence A. Pearson, co-inventors, both of Diorite, Michigan, U.S.A., 27th March, 1917; 6 years. Filed 8th January, 1917. Receipt No. 274,053.

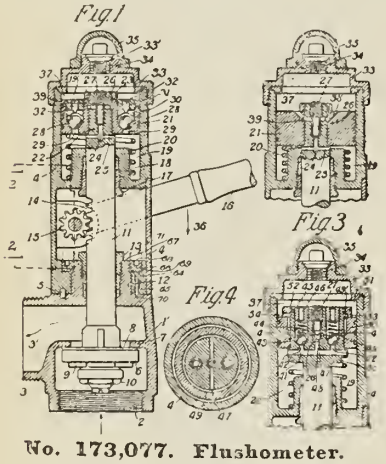
Claim.—A faucet having a spring actuated valve provided with an expanding stem, guide members for the stem, means for regulating the tension of the spring, one of said guide members including a cap, said cap having an extension provided with spaced ears, a valve actuating

lever pivoted between the ears, said lever having its pivoted end provided with teeth, slidable lock between the ears, and said lock having teeth adapted to co-act with the teeth of the lever to retain the lever in locked position, as and for the purpose set forth.

No. 173,077.

John L. Beck, Springfield, Massachusetts, U.S.A., 14th November, 1916; 6 years. Filed 27th April, 1916. Receipt No. 264,802.

Claim.—1. In a flushometer, the combination with the casing thereof provided with means for attaching the same to the service supply and bowl, respectively, of a main valve for opening and closing the source of supply, a valve stem, a piston secured to the upper end thereof, the casing having a chamber above and below the piston to receive a liquid, and the piston having passageways therethrough, balls to permit the liquid from one side of the piston to flow freely through the passageway when main valve is opened and to cut-off the flow of liquid to the other side of the piston through the passageways when the direction of move-



No. 173,077. Flushometer.

ment of the piston is changed, the valve stem having a passageway extending from one side of the piston to the other, a needle valve for varying the size of the passageway for controlling the flow of the liquid to the lower side of the piston during the return movement of the main valve to its seat, means for adjusting the position of the needle valve, means for manually moving the main valve from its seat, and a compression spring located on one side of the piston to assist the water pressure in closing the main valve, said spring being located within an annular chamber and directly engaging the lower side of the piston.

2. In a device of the class described, the combination with the casing thereof, means for directly attaching the casing to the water supply and the bowl respectively, a main valve a valve stem, a rack and pinion to move the main valve from its seat, the casing having a closed liquid receiving chamber, a piston therein and attached to the upper end of the valve stem, the lower end of the chamber saving an annular portion, a compression spring located in the annular portion and engaging the under side of the piston to normally retain the valve on its seat, said piston being formed with a chambered passageway therethrough, a ball valve passageway and normally seated to close the passageway when the main valve is located in the chambered portion of the closed and the piston elevated but permitting the ball valve to freely raise from its seat by the force of the liquid below the ball when the piston is lowered to open the main valve, the stem having a passageway formed therein, and two transverse passageways that connect with the ends of the axial passageway, the piston having a passageway that extends from the upper side of the piston to one of the transverse passages, a needle valve to vary the size of the axial passageway for regulating the flow of the liquid from the upper to the lower side of the piston during the time of the return movement of the main valve.

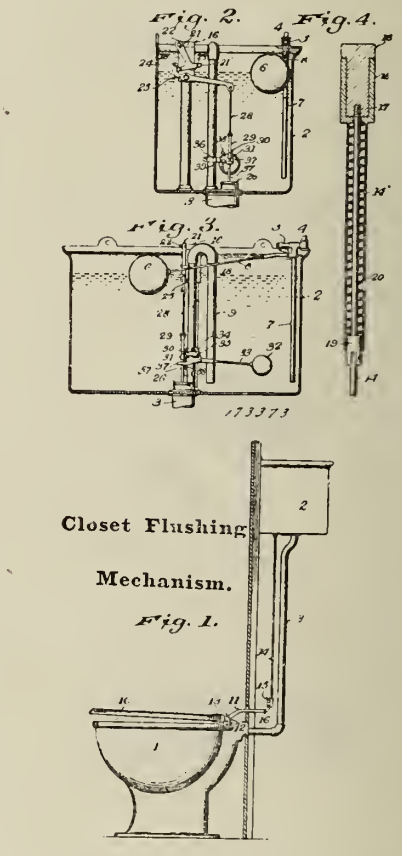
3. In a flushometer, a casing having chambered portions, a main valve in one of the chambered portions, a valve stem, a piston on the upper end of the valve stem and located in another chambered portion, a rack and pinion construction to move the main valve and piston in unison, the piston receiving portion being sealed to receive a liquid, a spring engaging the lower side of the piston to assist in maintaining the main valve closed, means to permit the liquid to freely flow through the piston during the opening movements of the main valve, said means comprising communicating oil passages in the piston and valve stem and which extend to the opposite sides of the piston, and valves movable automatically in the piston passages, a needle valve in the valve stem to vary the size of the passageway therein.

No. 173,393.

The Rundle-Spence Manufacturing Company, assignee of George Schwibinger, both of Milwaukee, Wisconsin, U.S.A., 21st November, 1916; 6 years. Filed 22nd September, 1916. Receipt No. 270,076.

Claim.—1. In a device of the described class, the combination with a water closet cistern having a discharge valve, of a valve rod, a conical stop affixed to said rod, a bracket rigidly supported above said valve, a float, a float supporting rod pivotally connected at one end with said bracket, a latch hinged at one end to said float rod and adapted to bear at its opposite end against said conical stop, the free end of said latch being adapted to be raised by contact with said conical stop as the latter is raised and to drop back beneath said stop as the latter passes said latch, said latch being adapted when beneath said conical stop to retain said valve in its open position, whereby the float supporting water is permitted to escape and said float to descend, whereby said latch is withdrawn from beneath said stop when said valve will again drop to its seat.

2. In a device of the described class, the combination with a water closet cistern having a discharge valve, of a valve rod, a conical stop affixed to said rod, a bracket rigidly supported above said valve, a float, a float supporting rod pivotally connected at one end with said bracket, said bracket being provided with an aperture for the reception of said valve rod, a latch hinged at one end of said float rod and adapted to bear at its opposite end against said conical stop, the free end of said latch being adapted to be raised by contact with said conical stop as the latter is raised and to drop back beneath said stop as the latter passes said latch, said latch being adapted when beneath said conical stop to retain said valve in its open position, whereby the float supporting water is permitted to escape and said



No. 173,373.

float to descend, whereby said latch is withdrawn from beneath said stop when said valve will again drop to its seat.

3. In a device of the class described, the combination with a water closet cistern having a discharge valve, of a valve rod, a conical stop affixed to said rod, a bracket rigidly supported above said valve, a float, a float supporting rod pivotally connected at one end with said bracket, said bracket being provided with an aperture for the reception of said valve rod, said bracket being formed of two members adjustably connected together, an adjustable screw having threaded bearings in said bracket and adapted to serve as a stop to limit the

(Continued on page 29.)

Australian Master Plumbers' Convention

Being Abstracts From Papers Read at a Conference Held by the Associated Master Plumbers in Australia—Some Very Good Points Brought Out and Discussed That Are of Interest to Every Sanitary Engineer in Canada.

IT IS very seldom we have the pleasure of hearing what other members of our craft are doing in other lands under our good old flag the Union Jack. We have, therefore, much pleasure in reprinting abstracts from some of the papers read at the last conference of the master plumbers of Victoria, Australia. We hope to have more information along these lines as often as possible in future.

The following paper proves that we in Canada are in a way struggling along similar lines, and by doing what we can here and really accomplishing something, we may be able to help our brothers across the ocean.

"REGISTRATION OF PLUMBERS"

By Mr. Alf. E. Atherton

The first subject on our paper is the Registration of Plumbers. Throughout Victoria this was an Act passed by Parliament about 30 years ago, but for some reason or other was let die until the new Chairman of the Board of Health (Dr. Robertson) recognised that to have good health we must have good plumbing work, as I remarked in my opening speech—"Prevention is better than the cure." Personally, the Registration of Plumbers is, in my opinion, the most advanced form of a appreciation of the plumbing world that any doctor could bestow on us; and, as Dr. Robertson fully recognises that the Plumber of to-day needs considerably more education than the general public can understand; but gradually, as the examination of Plumbers is made more severe, it will mean that Technical Schools will claim more attention. I think that before many months have passed we will have to give great attention to technical training. However, the present Plumbers must receive all due consideration, and as the honor of representing the Master Plumbers of Victoria at the Advisory Board to the Health Department has fallen to me, I think that it is my duty to fight for every Plumber who so desires to obtain every license he may choose to apply for, excepting sanitary license, when he has been at least 10 years working at his trade. Sanitary license would only be for those who hold a certificate equivalent to the Melbourne or Greelong Sewerage Board or other of equal standard.

This may appear lenient, but great consideration of this question has been given, and as most men in the trade have been in the habit of doing any part of this work unhampered, it would not appeal to me to deprive them of their living; and at present, owing to the Health Board having no power to supersede other examining bodies, it will be of no great account. But it is generally considered that in time this body will be the means of automatically wiping out the other examining bodies, and will naturally be the chief plumbing board of Victoria.

I have here Registration forms of the subjects that Plumbers are, or will be, required to have a knowledge of, and up to the present there are 300 new Plumbers registered. There is also another purpose that this will serve. It will be a record of Plumbers, and as the forms require you to state whether you are a master or an employee, or an employee of a Gas Company, it will give a general idea of where and how many Plumbers there are, together with the number of employers.

We have also adopted a system of the employee stating who his employer is. This will give us a good record of how many men are employed outside Master Plumbers' establishment.

Whilste on this subject I might join the licensing of Master Plumbers. Probably it would be a good move to try and bring in that no person except a registered Plumber be allowed to carry on work in connections with plumbing, whether to contract or day work, and with your approval I would certainly try and have a clause inserted to that effect; or it may be your desire that we go straight out for licenses for Master Plumbers.

"HOW TO TRAIN PLUMBERS—AND OTHER CRAFTSMEN"

Boys Should Be Taken From Junior Technical College

By Mr. C. H. Wright

Mr. C. H. Wright, instructor in plumbing at the Swinburne Technical College and the Bendigo School of Mines, attended the Greelong Conference of the Master Plumbers. In speaking on the technical training of apprentices, he said that for such training we had all the necessary machinery, equal to anything in the world. Boys should be selected from Junior Technical Schools. The type most desirable was the boy who was most able to understand and apply straight lines, draw, with a good idea of form, smart at arithmetic and competent to handle tools. Some subjects were general subjects, and useful to all boys, and some were special subjects, and only useful to those who were going to make their living by them. If special subjects were taught to all, they would cease to be special subjects. For instance, if everybody learned to make their own boots or clothes there would be no work for specialists in these lines. What Australia wanted was men specially trained in special subjects. He hoped that plumbing would never descend to the level of some trades that had ceased to be special trades, and were taught as general subjects. It behoved the members of Conference to watch over the interests of plumbing craft. After a boy was selected he should be given a trial, and if found suitable bound by indentures. Attendance at senior technical classes should be made compulsory by the insertion of a clause to that effect. But it was not fair that all responsibility should be cast on the instructor. This should be shared by the parents, the master, the student, and the instructor. The master should do his share by calling regularly at the school, inquiring in reference to attendance and behaviour, inspecting the student's theory note book and questioning him. It must always be recognised that technical training does not replace, it merely supplements the apprenticeship training. There were many weaknesses in the present system, some boys thinking they were to get experience in all branches. At the Bendigo School of Mines, during the past two years, he had tried the experiment of having boys one half-day per week during the master's time to attend for technical instruction. The result had been most satisfactory, and he was now arranging for the first year boys at Swinburne College to attend one full day each month. Boys should be treated as boys and given work and studies in keeping with their years. If given advanced work they were apt to become conceited and precocious. Common work well done was what was required. The Education Department divided the classes into four grades. Certificates in the first three were merely "encouragement certificates." The fourth or final grade certificate was the one of value. These fourth grade certificates, with certain adjustments, should be recognised by public bodies that grant licences for sanitary plumbing in Victoria. The outside plumber would still have the same opportunities, but a student who completed four years training at a technical school and won a fourth grade certificate, in addition to serving his apprenticeship, should at least be appreciated and acknowledged as a competent tradesman. Special recognition would encourage plumbers to take up a full course at a technical school, and the result would be better tradesmen. Benefit would accrue to the masters and the general public, not only in sewerage, but in all other branches of the trade. In two classes he had students ranging in the age from 16 to 40 years, and most of them would take the full four year-course. At the Swinburne College he had 50 students. Each one kept his tools, etc., in an unfastened locker, and he never heard of a single article disappearing. In the museum,

which contained items of interest connected with every branch of the plumbing trade, not one model, specimen or drawing had ever been removed.

"THE TRAINING OF APPRENTICES"

By Mr. W. H. Osborn (Bendigo)

To all Master Plumbers capable of serious thought, the question of training apprentices must be of interest. To my mind it appeals in many respects. When we realise how in the past the trade has been dragged in the mud, and by the work we frequently come in contact with, that it is reasonable it has been so; it makes one think, and by so doing we realize that the gulf between good and bad plumbing work should be permanently fenced off. As Master Plumbers we recognise the difference, and as men loyal to our craft, which should be second to none on account of its importance in every community, and by the scope it provides for the display of skill and intelligence, we should unitedly make provision to kill out the botchers who have become so thickly rooted as to shadow the public vision, with the result that the trade, which is worthy of the greatest respect, is held up to ridicule. To bring about a desirable advancement we must, firstly, receive the right material to work with, namely, the lads with the necessary qualifications to be moulded into scientific and intelligent workmen. The next step is to induce these lads to realise the necessity to study. To do this, it needs an example on our side. By setting aside a portion of their time of working hours and compelling them to study under a competent instructor, it instils into them the need for it, and by also insisting that a portion of their own time will be devoted to learning. Personally, I think the whole term of their indenture, namely, six years, should be devoted to practical and theoretical studies combined with their apprenticeship. If the masters allowed time off, equalling half a day per week, for the first two years (as we do in Bendigo, and which has proved very satisfactory), the apprentice will recognise the privilege given him and in common fairness make an effort to repay his employer.

I trust, gentlemen, that you will seize the opportunities that prevail, and thus do your part for the uplifting of the standard of the trade.

The next paper will be of particular interest, as we are actually at the present day spending too much time tendering upon work that is not given to the man who tenders, no matter what the quotations be.

Speculative builders as well as architects cater to owners out of pure curiosity. That is while the architect gets his fee for consultation and other services, which is all very proper, still the sanitary and heating engineer furnishes tenders by the score with no other apparent recourse but to go on and on wasting his time.

The writer found a case of one sanitary engineer actually saying to a speculative builder that if he would get out plans and procure a tender from Mr. ——— then he, the S. E. referred to, would do the job on a percentage basis. But had no time to lose in figuring, etc.

This was actually done, and the man who laid out the job and sent in a quotation was simply being used as a tool, and never had a chance of getting the job in the first place.

"SUBMITTING PRICES TO BUILDERS BEFORE TENDERING"

By R. Plumbe (Bendigo)

Mr. Chairman and Gentlemen,—

The subject which has been allotted to me is the much vexed question of submitting prices to builders and others when they (builders and others) are making up their tender for various works.

The problem to be solved is how to meet this difficulty and still keep on amicable terms with the contractors with whom we are perforce associated in our daily work. That Plumbers are not the only sufferers is manifested by the rule established by some, if not all, of the Builders' Associations, namely, that when tenders have been given for work which is afterwards modified, only the lowest tender shall submit an amended price. This very fact will doubtless, appeal to the sense of justice on the part of contractors, and cause them to readily accept the condition which the Bendigo branch of this Association has had printed upon the quotation sheets, to be used in common by its members. That clause sets out clearly that the price is given and accepted upon the distinct understanding that, should the contractor accepting it be the successful tenderer, then all the plumbing in connection with the work shall be carried out by the Master Plumber submitting the quotation.

This has the further effect of checking the practice of some builders of wasting the time of Master Plumbers by getting more than one price and using perhaps none of them. Further, it should check the practice of some Master Plumbers of giving a price when they have reason to believe that another Plumber has already submitted one to the same builder. This would not interfere in any way with the right of giving competitive prices for plumbing contracts when the Plumber himself, is the direct tenderer, in which event each firm must stand upon its own merits.

The ultimate desire of each member of this Association is, or should be, the maintenance of the dignity of the Trade, and one way of bringing that to pass is to promote the solidarity and good fellowship of the members, by standing for the rights of each member, even when there may appear to be some immediate personal disadvantage. If such an attitude be maintained there can be little doubt that all will ultimately benefit.

The following paper, or at least certain parts of it will be of interest to readers of The SANITARY ENGINEER. It is simply a matter of education and co-operation between employer and employee. There is no doubt at least in Canada, a better feeling on the whole, between the employer and employee, and where such a condition prevails there is no question about the results.

In one Canadian city there is a bitter feud on just now and it is much to be regretted. There must be something radically wrong, when men of like interests cannot decide to "bury the hatchet," give up each one some of their petty pig-headedness, for that is all it amounts to, and get right down to sound business. The following old fable of the two cats and a monkey is called to one's mind when one hears of employers and employees kicking up their heels: Once upon a time long, long ago, two cats stole a piece of cheese and could not agree which should have a certain piece. So they hied them to the judge, a monkey, and Mr. Monkey took a bite of one piece and then a bite of the other till there was no cheese left.

Capital and labor are both capitalists, one capitalizes on his labor and the other on his money, and therefore they have nothing coming to them when they fight or cannot agree.

"LABOR ONLY"

By Mr. F. Cox.

The "Labor Only" question is one of the worst troubles which the plumbing trade has to deal with. The results of this style of contracting are far-reaching and affect not only the financial issue, but what is most serious, the morals of the trade; and this fact is recognized both by masters and journeymen.

Builders who let plumbing labor only are not confined to a small class of jerry builders, as we find the practice is carried on in first class property. The idea of the contractor is to seize all trade commissions and profit on materials, which is legally the plumber's, and the labor only man's idea is to slap the work in, regardless of quality and make good wages. He is an irresponsible party who may be described in military language as "extremely mobile," and in consequence is careless of the results of his "slap it up" methods, and unlike the master of an established business, who has to reckon with his clients in the future for shortcomings of the present.

The result of the labor only plumbing is disastrous to the owners of the property, and means early and continual repairs. The moral of the trade is affected as the unfortunate property owner (in his innocence of the workings of labor only and the builder's greed) naturally comes to the conclusion that plumbers are a bad lot; and I am sorry to admit that he often has justification for his opinions. One remedy for the evil is the education of the people to an understand-

(Continued on page 29.)

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VOL. XI. AUGUST 15, 1917 No. 16

SPARE TIME AND WINTER NIGHTS COMING

THE time is not far off when the long winter evenings will be with us again. How are these long winter evenings going to be spent? Are those precious hours, minutes and seconds going to be wasted or invested? Are we going to master some puzzling technical problem, or solve some of the business troubles that, like the poor "are always with us."? The time is right now to plan our evenings. We should decide it before the long evenings are upon us.

Take up say the matter of making every move count, trying to save time, finding out how much time could have been saved or made more valuable by having first counted the cost of "not knowing how" at the proper time.

Or planning a simple bookkeeping system, along the lines described in some of the recent issues of SANITARY ENGINEER. Another way out, too, would be to consult some good correspondence school as to what they can do to help make one more valuable to one's self by spending a few hours a week on practical study.

Those who live in cities or towns where there exists a technical school can spend one or two nights very profitably. All such time spent not only assists one to make most of his time, but also assists in making one a better and more valuable citizen.

The main thing is, plan now or as soon as possible, and be in readiness to devote an hour or two each week just as soon as winter comes. Such studies will shorten the winter and thicken the bank roll just as sure as night follows day.

A NEW SERIES

IN the Sept. 1st issue we purpose publishing a new series of articles in SANITARY ENGINEER which will be of great value to every reader. We have referred to the series in another part of this issue, in connection with the recent convention held in Grand Rapids, Michigan, by the American Society of Sanitary Engineering.

The series will comprise a number of the papers read at the aforenamed event, but will be enlarged upon by way of showing how matters of this kind are of value to Canadian readers.

There can be no doubt about the fact that we can learn much by the exchange of ideas and discussions that come to us from our cousins to the south of us, and particularly so from the members who take part in the research work in connection with the society mentioned.

These men all hold prominent positions in different parts of the United States, and are in a splendid position to procure original data upon such subjects as are of vital interest to every sanitary engineer wherever located.

PLANNING AHEAD

FROM what can be learned, we find that never before in the history of Canada has there been so much thought given to sanitary fixtures being installed in rural homes.

Farmers are arranging to have their homes equipped with bathrooms and to have sanitary sewage disposal systems constructed. In view of these facts we purpose publishing a series of articles on sewage disposals for country homes in Sept. 1st issue. These articles will be based upon the very best and latest practices, and full particulars will be given as to proper sizes of tanks, etc.

The question of ventilation of such appliances, too, will be gone into, showing how very necessary it is to furnish a supply of fresh air to the septic tank, and reference will be made to the reason why the tile pipes will not freeze in spite of the fact that they are only placed about 12 or 14 inches below the level of the surface.

Those who have any back copies of SANITARY ENGINEER will do well to refer back to some of the articles dealing with this subject, and they will be pleased to note that we have not as yet had one single complaint about a system installed as advised by SANITARY ENGINEER having caused any trouble whatever. These facts should re-assure those of our readers of the soundness and dependability of the advice and instruction given in this matter.

We might, however, add that if perchance there are any points which do not appear to be quite clear to any of our readers, we will be pleased to further explain the points in question as promptly as possible, particularly as we know such information no doubt will be required to assist our readers to complete work undertaken on the farmer's behalf and which should be completed before the cold weather is upon us. We court inquiries, the answering of same will be our pleasure.

Practical Sanitary Engineering

The First Course of Its Kind Ever Published in Canada—Specially Prepared for the Craft Coming Up, as Well as Those Who in These Days Construct Work Simply Because the "By-law Says So"

BY THE EDITOR.

(*Continued from March 1st Issue.*)

THE article in March 1st issue concluded by describing various types of traps and centrifugal motion as applied to traps. On account of the cylindrical shape of many traps, the water on its downward flow forms a spiral piston which will very often syphon sufficient water out so as to break the seal of the trap.

That is the reason why many traps require an antisyphon pipe, or what is more commonly known as a back vent.

The deep seal, drum or centrifugal trap is not so apt to be syphoned because of there being a larger body of water in the bowl of the trap, which would require to be contracted before it could be drawn through the waste pipe. Several are shown herewith and by looking carefully at the design, this explanation will be easily understood. The whirlpool or centrifugal trap if properly designed has many features in its favor. First, its deep seal, thus assuring that it will remain sealed longer than the ordinary trap. Next it is less liable to be emptied by syphonic action, capillary motion etc., and it is more likely to be self cleansing.

Many cities in Canada and United States allow only this type of trap to be installed, and in some towns in Canada the back-vent or antisyphon pipe is not allowed under certain conditions.

To thoroughly understand, however, why vent pipes are necessary, one should always try to remember that water acts as a solid piston when being discharged from a fixture through a waste pipe.

It should for the time being also be assumed that air is a solid, though of course it is compressible.

Now suppose the w.c. is flushed on the second floor see Fig. 1. The water will no doubt form a piston and drive the air down. Let us for the moment imagine that the vertical portion is 15 feet, and the horizontal 50 feet from the foot of the stack and the main sewer. This water piston has for a few moments to reverse the motion of the air in the stack, because prior to the flushing, the air was on an upward motion. Now, what is most likely to happen. Some of the water in the trap seals will be set in motion, and if such is the case, a portion of the water in the disturbed trap will be spilled over the weir of the trap, thus reducing the depth of the seal. So it will be seen that

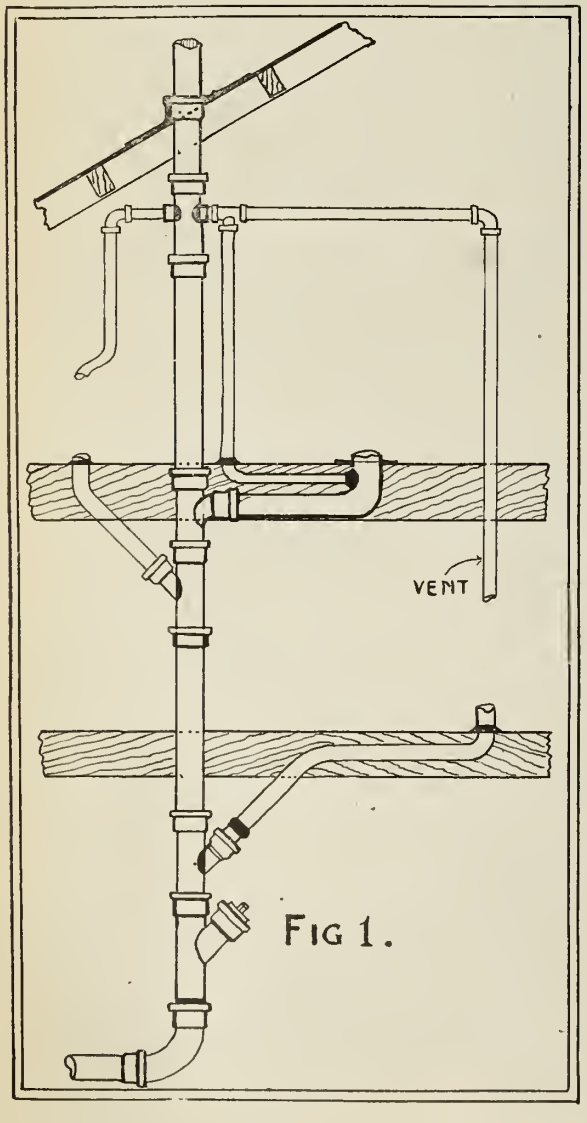


FIG 1.

EDITOR'S NOTE

One of the worst features in our trade is the fact that some of the simplest matters are not given even a little thought. We are apt to let things pass which we should not. For instance, the burr on a piece of brass waste pipe at the trap. When cutting it the right length a sharp burr is left on and cut, hair and the like catches on to these sharp though slight obstructions. Just recently the writer inspected a beautiful job, as regards layout and general appearance. Yet almost every trap in the house caused trouble as a result of this simple matter named, particularly the wash basin and bath trap.

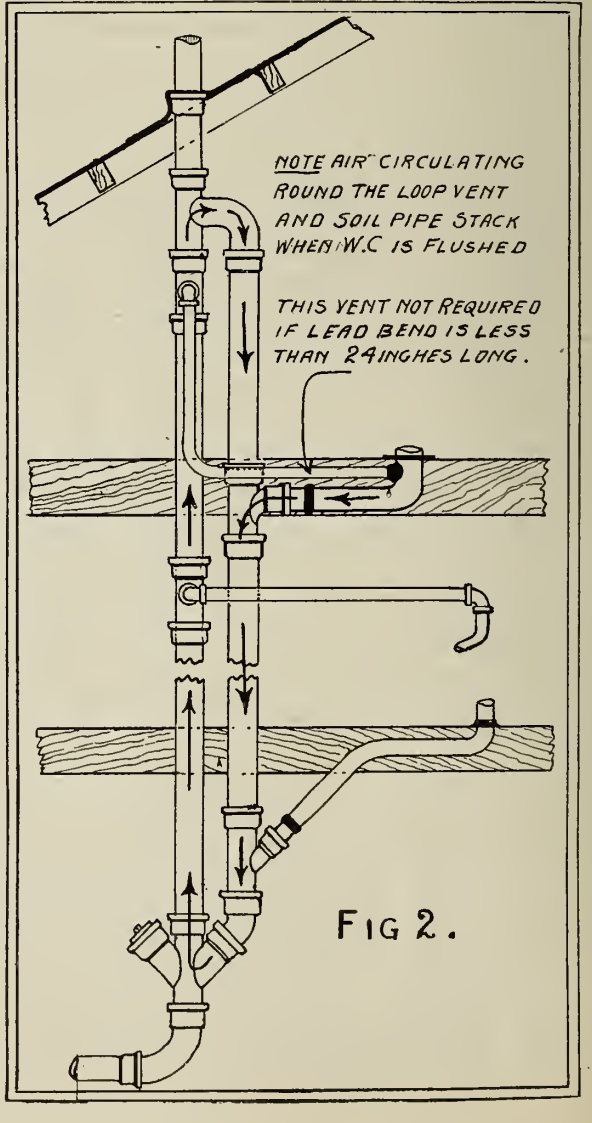
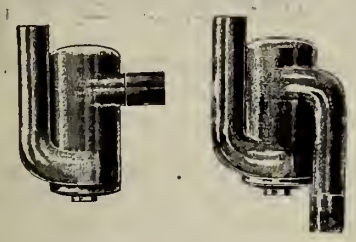


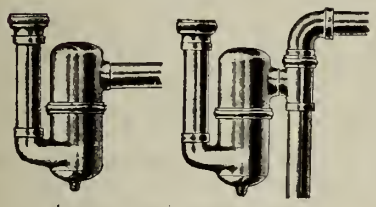
FIG 2.

some means should be employed to prevent the water seals in any of the other fixture traps being disturbed. This danger, however, can be overcome in more than one way. First, of course by back venting each trap; and, second, by making an air loop or stack as shown in Fig. 2.

Many towns and cities demand that all vent and soil pipe stacks be so con-



Lead Whirlpool Traps.



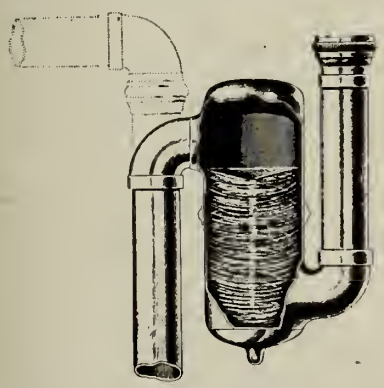
Brass Centrifugal Traps.

structed, and particularly in single houses, or say a house with one or two bathrooms situated one over the other. Then again an air or vent loop prevents the water piston having to momentarily reverse a greater volume of air as would be the case in Fig. 1.

But we must not be led to think however, that the back venting of a trap is only required to serve the purpose mentioned.

Here is another condition which makes a vent pipe very necessary.

Suppose, for instance, a bath is situated say 8 or 10 feet or even more from the main soil pipe stack, the plug is drawn and a head of water of say 1



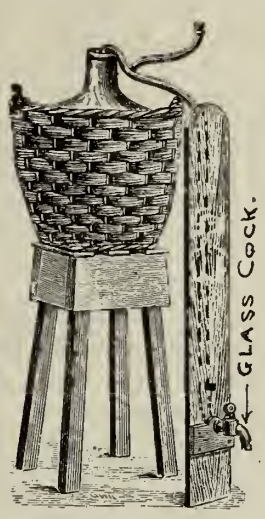
Action of Water in Whirlpool Trap

foot is being emptied, the water on the waste pipe will be very likely a solid piston, and the suction created will be very great. There being such a long column of water the trap seal would very likely be broken, but if a vent pipe is connected to the trap, it will break the suction and there will be sufficient water left in the trap to seal it.

Referring again to the loop vent shown in Fig. 1, it will be seen that such a loop is much to be desired.

It is only a matter of connecting the regular vent at the foot of the stack, and if this were done in every case it would be very easy to connect an additional fixture up on a lower floor without having to carry a separate vent through each floor above and up through the roof.

It is all a matter of giving the subject a little thought, and when laying out a plan, one thing should always be kept in mind, that all plumbing fixtures be installed as near to a soil pipe stack as possible, thus avoiding long horizontal runs of waste piping and if such long runs cannot possibly



SYPHON USED FOR SULPHURIC ACID

be avoided, there should be some means furnished for cleaning out the pipe, and a vent of sufficient size provided. The practice of reducing the vent one size smaller than the size of the trap is not always good.

In localities where the roof terminals are apt to become closed with hoar frost, the air loop would prove very efficient.

Suppose, for instance, the sink is used on the ground floor, the water as it flowed down, even though it be a solid piston, would simply set the loop of air in motion at least until such a period as the water reaches the horizontal, and then it would be apt to alter from a round shape to practically flat, and in that way any air in the horizontal pipe would be sent along or reversed in motion at the top of the surface of the water, while the water at this period would not fill the whole bore of the pipe.



Showing Motion of Water.

(To be continued.

NEW TINSMITH'S HELPER AND PATTERN BOOK

A new and splendid book has recently been published bearing the above title by the U. P. C. Book Company, New York, and written by Hall V. Williams. It contains more real practical information of great value to both plumbers and sheet metal workers for its size than any other book ever published.

It is a book pocket size, 312 pages, 247 figures, and 92 tables.

The chapter of tables contains practically all the data required by sheet metal workers. U. S., as well as Imperial gallons are given.

There is a large number of new as well as old tried formulaes that are almost invaluable to every mechanic whatever be his trade.

We certainly compliment the publishers of this book upon having compiled a work that will without doubt, be thoroughly appreciated by everyone who becomes a possessor of the book.

Full particulars as to price, etc., may be procured by writing to The Maclean Publishing Co., Ltd., Book Dept., 143-151 University Avenue, Toronto.

HUMAN WASTE

Elimination of waste in productive enterprises is one of the first importance in the development of Canadian industries. Human wastage in modern industry exceeds all other forms of waste, and yet it has not received one-tenth of the attention given by employers to other forms of wastage. Efficiency systems have been installed by manufacturers without number, but very few have established any system to develop human efficiency. The percentage of waste in any industry will always depend upon the average unit of intelligence in the force of men employed. The man upon whom you can depend to carry out your system is always more important than your system. A good man nine times out of ten, will make a poor system work well, but no number of poor men will ever make any good system work well.

In modern industry the human factor has not been given attention. Waste in machinery and material has been carefully checked by most industrial firms, but human waste has not been accounted for in most accounting systems. Yet the cost of the human scrap heap is greater than that of machinery or material. In fact, human waste is a greater menace to the development of modern industry, along lines profitable to the nation in competition with foreign countries, than any other form of waste.—G. L. Sprague, Principal of Hamilton Technical School.

Mersea Township, Ont. — Township Council contemplate tile drainage, costing $90,000.

PRACTICAL SHEET-METAL WORK

THREE PIECE ELBOW WITH GUSSET OR GORE PIECE.

BY THOMAS STANFIELD

IN this article we deal with the development of pattern for a taper piece which has the small end at an offset with the large end. Such a fitting is particularly useful in furnace work, where two branches are required from one pipe, viz., one off the side when an ordinary 45 degree branch is used, and one from the extreme end of the pipe. In fact there are a great number of places in which such a fitting would do away with the use of two elbows.

It will be noted that the whole pattern is developed from the elevation. First, draw the elevation as shown at Fig. 1. From it develop the plan of diameters. These diameters may be any measurement. The line A B is used as base for elevation as well as centre line for half plan of large end.

Take the straight edge and extend dotted lines from A B C D until the two lines meet, the point of intersection is shown at E. Next extend the base line as shown to F. This point is determined by taking the square and drawing dotted lines as shown from point E.

Next take the compasses and divide the half plan of the large end into 6 equal parts as shown 1, 2, 3, 4, 5, 6, 7.

The next step is to determine the proper points of intersection on base line. This is done by placing point of compasses at F and extending the points shown at 1, 2, 3, etc., on half plan to base line A B, these points determine the proper distances between A 1, C 1, A 2, C 2, etc.

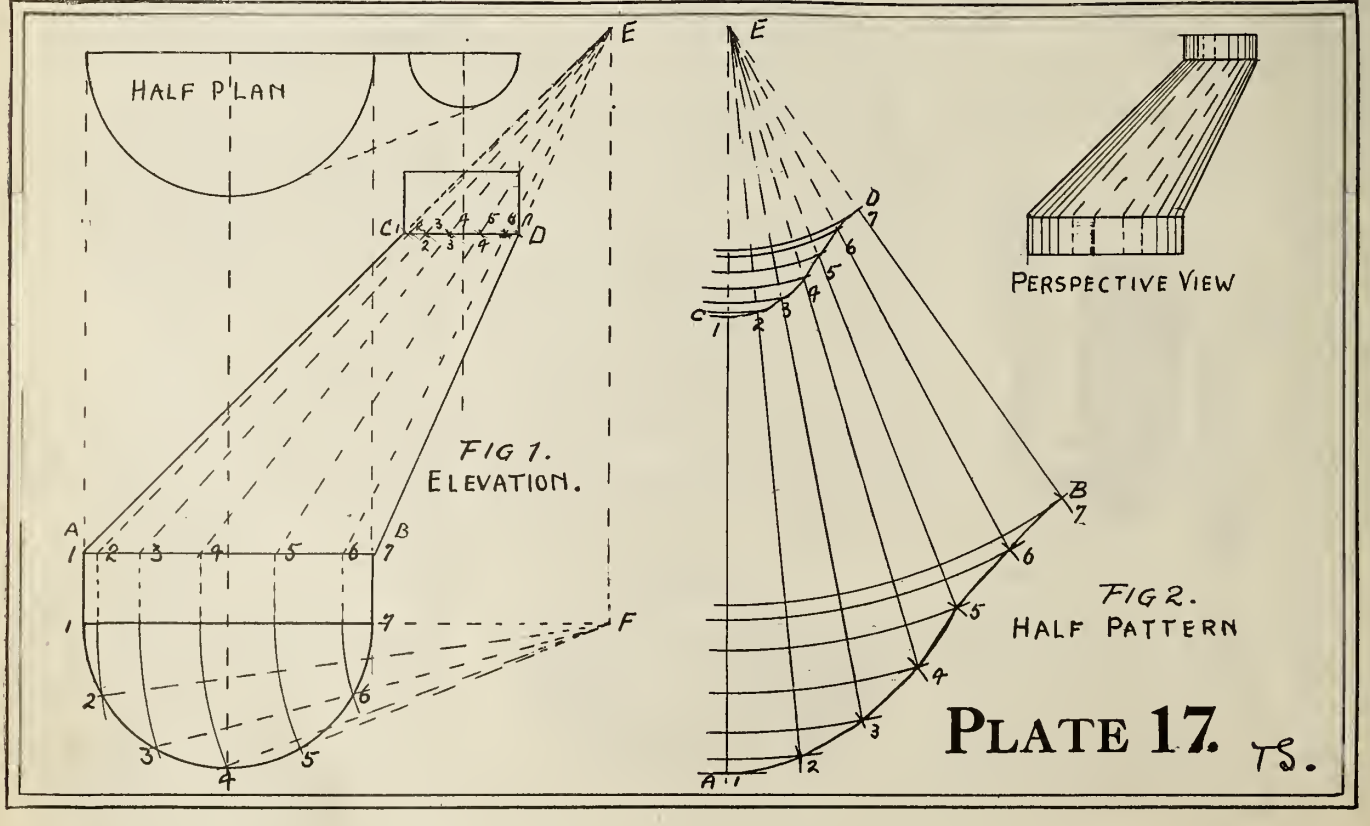
The next step will be to draw solid lines as shown on profile, and then erect a vertical line as shown at A C E Fig. 2.

Next place the point of the compass at E, Fig. 1 and transfer the measurements between E and points on base line A 1, 2, 3, etc., to Fig. 2 by placing the compass point at E, Fig. 2 drawing arcs as shown. Now transfer the measurements 1, 2, 3, 4, 5, 6, 7 on half plan cutting the arcs just completed in Fig. 2.

From these points develop erect lines to point E in fig. 2.

The next step will be to open the compass up and place point at 1 on base line A B, Fig. 1 to 1, 2, 3, etc., on line C D on Fig. 1, transferring these measurements from points A B 1, 2, 3, 4, 5, 6, 7, on Fig. 2 cutting the lines erected from A B to E as shown at C D. This will give the points to be used which is required for pattern of small end. If this pattern is developed on sheet metal, the various points may be punched with the fine point of a scratch and simply cut with the snips as shown by solid outline at A, B, C, D, Fig. 2 in half pattern. The two collars are made in the usual way and need no explanation; allowance should be made for seams and locks,.

(Continued in Next Issue)



Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

Movements in commodity prices connected with the plumbing trade have been both in upward and downward direction, with the prospect in some lines that the situation with respect to getting supplies of raw materials will be even more acute. Now that the United States has adopted the system of requiring licenses to export iron and steel, Canadian manufacturers are finding their operations hampered. There is difficulty in getting these licenses except where the iron and steel is to be used for military purposes. This demand must first be supplied, then after that domestic requirements will be looked after. More and more the energies of the country are being turned toward winning the war. One of the lines to feel the effect of this regulation almost immediately is that of wrought iron pipe. Soil pipe and fittings have been moved to higher levels. Solder, wiping solder, caulking lead and solder wire have been reduced in price, due to the easier situation in the primary market for pig lead. Business on the whole is reported fairly good, being particularly so in valves.

TORONTO, Aug. 14.—Price movements show a divergency in their tendency during the time since last issue. In lead products there have been lower prices, while in soil pipe and fittings higher prices have been recorded. There has been less inclination to advance prices during the week, as it is recognized that levels are already high and manufacturers and dealers are endeavoring to keep prices within a range where trade will not be entirely shut off. There has been a seasonably good trade in the various lines connected with the plumbing trade. Shortages of materials are still more apparent, due to the recent action of the United States Government in still further restricting the shipments of iron and steel into export channels.

Pipe Materials Still Further Restricted

WROUGHT PIPE.—The recent action of the United States Government in stipulating that all shipments of iron and steel for export must be licensed by the Government is having the effect of still further restricting the supplies of raw materials for pipe. Iron and steel products cannot be sent into foreign countries until the needs of the United States Government and her Allies are first met for military purposes. Steel and iron continue to come into Canada for use in the munition plants and other necessary military work, but all needs will have to be satisfied before these raw materials can be turned into domestic channels. Deliveries of raw materials have accordingly been held up on account of this embargo. There is not much new demand for pipe developing in the face of conditions, manufacturers being concerned with filling booked orders. Prices remained unchanged.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917

	Black	Galvanized
Standard Buttweld	Per 100 feet	
⅛ in.	$ 5 00	$6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES

4" and under, 45%

4" and under, running thread, 25%.

4½" and larger, 40%.

STANDARD COUPLINGS

4" and under, 35%.

4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces

Booked Orders On Enamelware Being Filled

ENAMELWARE.—There has been a fair movement of cast iron enamelware during the time since last issue. The greater part of the business, however, has been on booked orders and the movement on this account has been good. New business is inclined to be slow. There is a steady situation so far as prices are concerned, there being no disposition toward a change. The opinion is expressed by those closely identified with the trade that prices have probably settled down for some time at least.

Bath-tubs, roll rim, 4, 4*, 5 feet, 24 to 30 in. wide	$32 10
Bathtubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple	16.80
Closets, oak tank and seat	22.00
Do., enamel iron or white vitro tank	23.75

Soil Pipe And Fittings Go Higher

SOIL PIPE, FITTINGS.—Soil pipe and fittings have been increased in price during the week through the changing of the discounts. Medium and extra heavy soil pipe up to 6-inch is now quoted at 35 and 2½ per cent. off list, as compared with 45 per cent. formerly. Eight-inch soil pipe has been advanced to 30 per cent. off list, the former discount being 35 per cent. Medium and extra heavy fittings are now quoted at 40 and 2½ per cent., as compared with 50 per cent. formerly. Cast iron pipe fittings and malleable fittings have remained unchanged. Advances above recorded are due to higher costs of raw materials.

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	15%	18%
Cast elbows, tees, etc.	15%	18%
Plugs	32%	30, 5%
Bushings	35%	40%
Flange unions, standard	22%	25 %
Dart unions, ¼-inch to 2-inch	25%	24 2-3%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4 in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.	0.50	0.62
Do., Class B, lb. net	0.22	0.31-33
Do., Class C, lb. net	0 15	0.21-0.22

Valve Demand Still Continues Heavy

VALVES.—There is a continued heavy demand for valves, particularly those used in steam work. This condition is taken as an indication that industrial development is going forward. Some factories are working to their capacity, and have been for several months past. Prices remained unchanged at recent quotations.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46

Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	15
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Oakum Prices Held In Steady Market

OAKUM.—There was a steadiness in the market for plumbers' spun oakum during the week, with quite a range in prices being noted. Quotations ranged $8.50, $9 and $10 in bale lots, and $9, $10 and $12 in less than bales. Demand has been fair. For marine oakums there has been an improvement due to the recent orders that have been placed for wooden ships.

		Per 100 lbs.
Best American	....	$21.00
U.S. Navy (American)	....	20.00
Plumbers' Spun	8 50	12.00

Range Boiler Output Is Still Restricted

RANGE BOILERS.—Manufacture of range boilers is still being restricted owing to inability of the manufacturers in getting sufficient supplies of raw materials. Galvanized sheets and plates are booked ahead with the mills for months into the future and the restriction of shipment of iron and steel except under Government license by the United States will further restrict supplies that reach this market.

30-gallon range boilers, standard	$13.00
35-gallon standard	14 50
40-gallon standard	15.50
52-gallon standard	28.00
30-gallon extra heavy	17.00

Market For Sheets And Plates Stationary

SHEETS, PLATES.—Prices on black and galvanized sheets held stationary during the week. There is a slight inclination in the primary market toward a break owing to the investigation as to costs that is now progressing. Locally the situation held steady, dealers expressing the opinion that prices would not recede in this market. Galvanized sheet stocks are low, and the market is one of firmness, higher prices not being an improbability in view of the lightness of stocks, which are now almost extinct without chance of replenishing. Demand for galvanized sheets, however, has been light, but on black sheets the demand is above normal for this season of the year.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$....	$11 50
12 gauge	10 05	11 60
14 gauge	9 95	11 65
16 gauge	10 00	11 75
18-20 gauge	9 80	10 80
22-24 gaug	9 85	10 85
26 gauge	9 90	10 90
28 gauge	10 00	11 00
29 gauge	10 10	.....
3-16 inch plate	.....	12 25
¼-inch boiler plate	.....	12 00

GALVANIZED SHEETS—	Per 100 lbs.
10¾ oz.	$12 00
U.S. 28	11 70
U.S. 26	11 40
22 and 24	11 25
18 and 20	11 10
16	10 95
14	10 85

F.o.b. Hamilton, Toronto.

Corrugated Sheets Are Still Unchanged

CORRUGATED SHEETS, EAVETROUGH.—So far as prices go the situation on corrugated sheets remained unchanged during the week. Dealers, however, assert that local prices are about on a par with the cost of production, and that such a condition cannot long maintain. The factor that has caused the market to halt in these lines during the past two or three weeks has been the possibility of fixing lower prices in the United States. The opinion is expressed locally that there seems to be small chance of any lower prices being brought about in the United States. Eavetrough and conductor pipe are still quoted at 10 per cent. off list. There is a firmness in the local market for all commodities manufactured from galvanized sheets, and even in the face of the halting tendency in the United States higher prices are anticipated in some quarters in this market.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7 20
No. 26 gauge	9.60-10.00	....

Boiler Tubes Are Moving Quite Freely

BOILER TUBES.—Dealers report a very gratifying movement of boiler tubes; all that could be expected, in fact, at this season of the year. Prices held in steady position with the intimation made by those closely in touch with the situation that they are likely to remain so for some little time. There is no disposition to advance prices beyond present levels in the face of the fact that demand might be shut off.

1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
4-inch	82 00	67 00
3½-inch	70 00	55 00

Solder Declines 2c To 2½c Per Pound

LEAD AND ZINC PRODUCTS.—A decline of 2⅛c per pound was registered on strictly half-and-half solder during the week, which now makes the price 38¾ to 39c per pound. Commercial solder declined 2c, and wiping soldier went down to the same extent. Guaranteed solder, however, maintained recent price at 42c. The easier tendency has been due to a corresponding condition in the pig lead market, and also to the fact that local dealers were eager to stir up business in the face of a quiet midsummer demand. Caulking lead is down ⅛c and is now quoted at 14¾c per pound. Prices of lead pipe and other commodities remained the same as last week.

Lead pipe, lb.	$ 0 19	....
Lead waste pipe, lb.	0 20	....
Lead traps and bends	20% on list	
Lead, wool, lb.	0 17	....
Lead, caulking, lb.	....	0 14¾
Lead sheets, 3 lbs. sq. ft.	0 17¾	....
Lead sheets, 3½ lbs. sq. ft.	0 17¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 17½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 42	....
Solder, strictly, lb.	0 38¾	0 39
Solder, commercial, lb.	0 38	0 38½
Solder, wiping, lb.	0 34¾	0 38
Solder, wire, lb.	0 41	0 45
Zinc sheets, per lb.	0 26	....

Old Material Market Is Marking Time

OLD MATERIALS.—There was a steadiness to the market for old materials during the week, which to those closely identified with the trade looked more like a marking time operation. Offers to buy or sell large quantities could not induce any movement either way. The trade is reported to be moving along without feature of any kind. Mills are taking a little, and there is plenty being offered by local dealers to the large wholesalers. The market is not unsettled, but might be characterized as a waiting one. Prices held steady during the week in consequence.

Tea lead	$ 0.08¼	.....
Heavy lead pipe	0.10¾	.....
Yellow brass	0.14¾	0.15
Red brass	0.22	.....
Light brass	0.09½	0.10
Heavy zinc	....	0.07½
Heavy copper	0.25	0.26
Stove plate, per ton	17.00	18.00

Copper Is Lower; Tin In Firm Market

INGOT METALS.—Hot weather has affected the trade in ingot metals by a diminution. People are now into the holiday period and business is lighter in consequence. However, relief from the heavy volume of business in recent weeks is stated to be welcome.

COPPER.—Lower prices were quoted locally on tin, being down 1½c per pound on electrolytic and 2c per pound on casting copper. Former is quoted at 34c and latter at 32½c per pound. Weakness is due to increase of visible supply over world's prospective needs for near future.

TIN.—There was a continued firm position for tin during the week and prices were quoted 2c higher locally at 64c to 65c per pound.

SPELTER.—The spelter market is steady in tone during the week and prices remained unchanged at 11c per pound.

LEAD.—The market for this commodity continues to hold up well in view of quietness in the trade at primary points. Locally prices are 13½c to 14c per pound.

American Society of Sanitary Engineers Holds Successful Convention

A Large Number Present—Keen Interest Shown, and a Big Programme Gone Through

ONE of the most successful conventions ever held by the above association took place at Grand Rapids, Mich., on Aug. 1, 2 and 3. There were over 100 present all of whom took a deep interest in the proceedings.

The chairmen of the various committees read their reports and there were also read a number of interesting papers of so important a nature and of so great value to those engaged in sanitary engineering construction, that we purpose publishing them with comments, showing how these very same problems that have to be coped with by our cousins across the line, are applicable to the craft in Canada.

The titles of the papers read were as follows:

The Man House Trap.

U. S. Standards with respect to Plumbing Installations in Government Buildings.

Causes of Iron Rust in Domestic Water Supply.

Standardization of Brass Goods.

Proposed Standards for Federal State and Municipal Sanitary Codes.

Our Profession and Society.

Dual Water Supply and Cross Connections.

Discussions upon the various papers were indulged in and some splendid points were brought out.

Public comfort stations their need and valuable suggestions as to their location and construction received quite a lot of attention many of which will be dealt with in SANITARY ENGINEER at a later date.

The lavatory waste came in for no small amount of criticism and the convention as a whole seemed to think that this patent overflow should be dispensed with. It is insanitary and can not be easily cleaned.

As we stated before, these problems and papers will be published in SANITARY ENGINEER, beginning with Sept. 1 issue.

Quite a large number of exhibits were on hand, such as newly designed plumbing installations, small model fittings being used, traps of various kinds, and a large number of drawings, etc.

The entertainment committee did splendid work and their programme went off without a hitch.

A ride out to the Grand View Auto Club house and a stag dinner, was the first item. A visit was made to the plant of the Wolverine Brass Mfg. Co., Grand Rapids, and the accompanying photo taken. The interest shown in this event, was splendid, many members becoming better acquainted with the goods they have to install from time to time.

The ladies joined in a theatre party on the evening of Aug. 3 with a banquet at the Pantland Hotel, the headquarters of the convention.

Every member present expressed his appreciation of the work done and looks forward to another successful convention which is to take place next year in Chicago.

TRADE GOSSIP.

Elford & Company, plumbers, have commenced business at Saskatoon, Sask.

L. Michael, Gleichen, Alta., has moved his tinsmith and plumbing business to Fifth Avenue.

HUMIDITY MEANS HEALTH

In this day and age, when we are being enlightened by the sciences and the arts, we must make up our minds to leave behind us many of the ideas and theories of bygone times, for to-day we are in possession of positive proof that many of our ideas, especially as regards living, did not lead us along correct paths.

Nothing, perhaps, has received more attention than the subject of health. Societies and associations have been formed to educate and help the uninformed (many of the educated themselves need their help), lectures have been given, and some of the States have sent corps of men among factories and workers to enlighten them on this all-important subject.

Not long ago many consumptives were kept in warm, badly-ventilated rooms; to-day the treatment prescribed is fresh air and lots of it. In the depth of winter people troubled with this terrible disease are properly wrapped and live and sleep in the pure, fresh air, getting as much sunshine as possible. Sleeping porches are becoming as necessary in the modern house as is a kitchen.

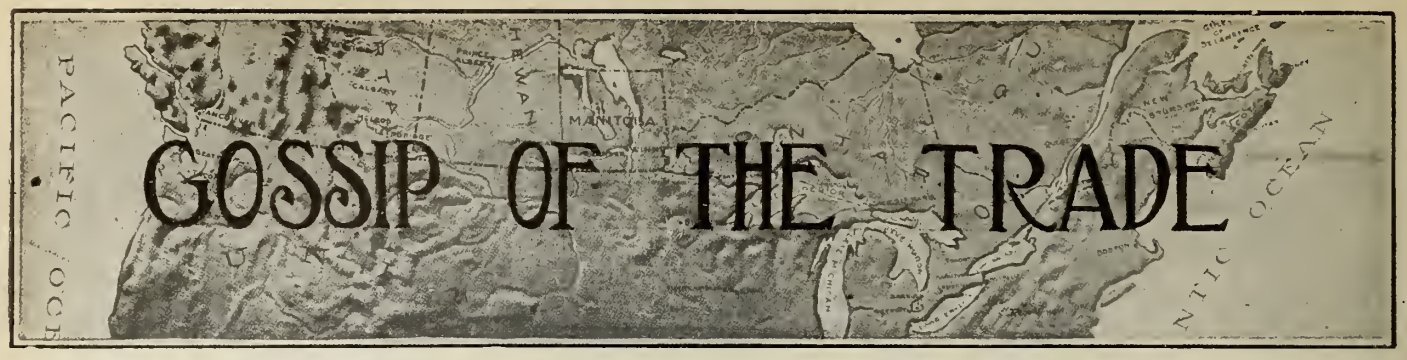
The Reid Geisler Mfg., Co. 326 Madison St., Chicago, have recently put out a new line of humidifiers known as the Burlington Humidifier. It is fitted with a wick which sets up a more active evaporation of the water than is the case with a "wickless" type. Full particulars may be procured by writing the above named company.

CONNECT WITH SEWERS.

Dr. J. P. McNally, of Guelph, district medical officer of health has advised the Galt Board of Health to make all properties now empting sewerage into either Mill Creek or the Grand River, connect with the sewer if the accommodation passes the property, and if not to instal dry earth closets.



Part of group photo of delegates in attendance at the Grand Rapids, Mich,, Convention.



INCORPORATIONS.

Hespeler, Ont.—A. B. Jardine & Co., Ltd., capital $300,000, to manufacture tools, machinery, plumbers', pipe-fitters' and wood-workers' supplies, etc.

Northern Products, Ltd., has been incorporated at Montreal, Que., with a capital of $50,000 to manufacture and deal in oils, greases and products required in sanitation and public works.

Montreal, Que. — Sydney E. Junkins Company, Ltd., has been incorporated with a capital of $400,000 to carry on engineering, general construction, sewage, drainage and sanitary engineering.

Sherbrooke, Que. — Mackinnon Steel Company, Ltd., has been incorporated with a capital of $500,000 to carry on business as engineers, manufacturers of steel pipes and castings and general metal workers and foundrymen.

CONTRACTS AWARDED.

Haileybury, Ont.—F. R. Gibson has the plumbing contract in connection with school work, costing $5,000, for the Public School Board.

Halifax, N. S.—Hagen & Co., Sydney, N.S., have plumbing and heating contract for Athletic Club building for H.M. Admiralty Dockyard.

. Toronto, Ont.—Purdy, Mansell, Ltd., 63 Albert St., have plumbing and heating contract for $25,000 building for Dominion Bank at St. Clair and Yonge Sts.

Chatham, Ont.—George Ross & Co., 11 King St. E., Brockville, has the plumbing and heating contracts for $44,500 brick addition to school for the Board of Education.

Toronto, Ont.—A. Welch & Son, 304 Queen St. W., have plumbing and heating contract for $80,000 mill and brick warehouse for Davis & Mehr, Union Bank Building.

Toronto, Ont.—Sheppard & Abbott, 78 Harbord St., have plumbing and heating contract for $25,000 addition to hospital for Women's College Hospital and Dispensary, 125 Rusholme Road.

Maisonneuve, Que.—J. J. Briard, 1277 St. Dominique St., has the roofing, plumbing and heating contracts for $175,000 steel, stone and brick school for the Roman Catholic School Commissioners.

Montreal South, Que.—Julien Toussaint & Cie, Ltd., 83 Craig St. W., has the contract for water mains, valves, hydrants, sewers and manholes, for elevated steel tanks for waterworks, etc., costing $180,000.

WATERWORKS, DRAINAGE, ETC.

Burlington, Ont.—Town Council contemplates sewers costing $45,000.

Maidstone Township, Ont.—Township Council contemplate drainage work.

Culross Township, Ont. — Township Council contemplates drainage system.

OBITUARY.

Magloire Dube, of M. A. Dube & Company, plumbers, Montreal, Que., is dead.

OWEN SOUND TO HEAT FIRE HALL FROM TOWN HALL FURNACE

A proposed new heating scheme for the municipal buildings has been under consideration by the authorities concerned for some time, but as yet nothing definite has been done. It is proposed to dig a tunnel from the town hall furnace rooms to the fire hall and to heat the two buildings from the town hall furnace. The firemen it is understood have agreed to do the necessary digging and the committees concerned are now ascertaining the cost of the improvement and the saving in fuel and in labor that would be made. The Town Hall furnace is amply large to supply heat for the two buildings and it looks as if a considerable saving in the town's fuel bill will be effected. To render the present boiler in the fire hall serviceable for next winter it will be necessary to spend about $150 on repairs to it.

A REPRINT

Readers of SANITARY ENGINEER will be interested to know that the article entitled "Steam Condensation Valuable—Why", has been put up into



Another group photo of delegates in attendance at the Grand Rapids, Mich , Convention.

book form and is being distributed free to the trade by Geo. W. Cole, Ltd., 838 Dundas Street, Toronto. There are a number of other interesting items added to the article and no doubt many of our readers will be glad to get one of these books.

A postal will procure one of them while they last.

A NEW HEAT REGULATOR

A new heat regulator that controls the heat at the radiator is now being manufactured and put on the market. It is not a heating system, but an independent appliance of itself. Specially designed to fit any type of radiator, either steam or hot water.

The Ja-Nar, as it is called, consists of two appliances in one. A steel cabinet fitted with louvres that open and close, second, a device operated with a syphon regulator, which responds instantly to the slightest change in temperature of the air circulating over and round it. The manufacturers claim that the temperature in a room can be automatically controlled and kept practically constant. Any temperature between 60 deg. and 80 deg. Fah., can be obtained by simply setting the regulator dial at the proper point.

Further particulars may be procured by writing to the Fulton Company, Knoxville, Tennessee, U.S.A.

PORTABLE PIPE THREADING MACHINE

At no period in the sanitary and heating trade has it been so necessary to conserve time as is the case these days. Sanitary and heating engineers find labor scarce, and work being kept back on that account. Taking these arguments for granted, more labor-saving devices are being bought and used, The above is a new device for cutting big sizes of pipe, as well as threading same. It is comprised of a rigid bench, gasoline engine with power saw attachment, along with a specially designed universal connection and gear case that can be attached to a pipe threading machine. The makers claim some very interesting qualities for the Columbus portable pipe machine.

Full particulars and descriptive literature may be procured by writing the manufacturers, the Columbus Machine Works, Columbus, Indiana.

NEW TORONTO BY-LAW

Continued from page 15.

All Work to Be Subject to Inspection By the Engineer—Certificate

66. All work contemplated in this by-law shall be done in a workmanlike manner, and shall be subject to the inspection, supervision and approval of the Engineer, or any inspector appointed by him; and all plumbing work required under this by-law shall only be done by a licensed master plumber, and all faulty or defective work which may at any time be discovered shall be made perfect to the satisfaction of the Engineer, or inspector appointed by him, and when so found satisfactory, a certificate shall be issued to the plumber at the expiration of seven days from date of inspection, unless in the meantime such work shall have become faulty or defective.

Penalties

67. Any person convicted of a breach of any of the provisions of this by-law shall forfeit and pay, at the discretion of the convicting magistrate, a penalty not exceeding (exclusive of costs) the sum of fifty dollars for each offence, and in default of payment of the said penalty and costs forthwith, the said penalty and costs, or costs only, may be levied by distress and sale of the goods and chattels of the offender, and in case of there being no distress found out of which such penalty can be levied, the convicting magistrate may commit the offender to the common gaol of the City of Toronto, with or without hard labor, for any period not exceeding six calendar months, unless the said penalty and costs (if any), including the costs of the said distress, and of the committal and conveyance of the offender to the said gaol, are sooner paid.

Enacted and passed in Council this 2nd day of October, 1916.

GEO. IRONSIDE, Reeve.
GEO. D. SCOTT, Clerk.

DOINGS IN OTHER LANDS

(Continued from page 21.)

ing of what good plumbing work is and the best way to secure the same. I am afraid this method would move the public to think that the master plumber was endeavoring to feather his own nest, and no doubt the labor only builder would be pleased at the opportunity to assist in the delusion. The surest method would be by organizing or legislation, or both.

An effort has been made in this direction by a conference held some months since, between masters and journeymen, which resulted in drawing up a scale of labor only prices which have since been included in the Wages Board determination. These prices were fixed at high rates, with the object of making it risky for the builder to engage labor only plumbers, as he would be liable for the full rate if the man demanded it. This preliminary work has not yet shown any results to speak of, and without further progress the effort will be lost.

The direction which shows the most promise of success is the Registration of Master Plumbers, who alone will be allowed to carry on plumbing work, and the refusal of the members of the Journeyman's Society to work for any other than a legitimate Master Plumber.

In the event of failure to secure the Registration of the Master Plumber there is still a reasonable hope for success by reciprocal arrangement with the Journeymen's Society, whose members would refuse to work for other than members of the Master Plumbers' Association, and on the other hand, masters would employ only members of the Journeyman's Society.

If successful in this endeavor, there is a splendid opportunity for the M.P.A. to purify the trade and make it binding on all its members to turn out respectable workmanship and give the public a guarantee of a good job for a reasonable outlay.

NEW CANADIAN PATENTS

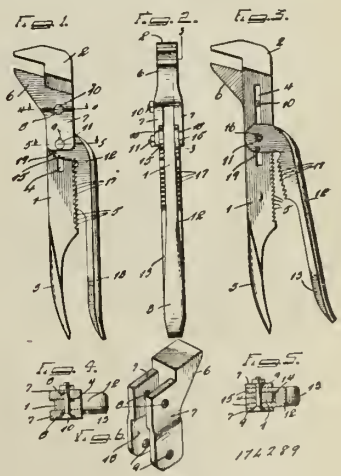
(Continued from page 18.)

upward movement of said valve, a latch pivotally connected at one end to said float rod and adapted to bear at its opposite end against said conical stop, the free end of said latch being adapted to be raised by contact with said conical stop as the latter is raised, and to drop back beneath said stops as the latter passes said latch, said latch being adapted when beneath said conical stop to retain said valve in its open position, whereby the float supporting water is permitted to escape and said float to descend, whereby said latch is withdrawn from beneath said stop when valve will again drop to its seat.

No. 174289.

Ole H. Mellum, Union, North Dakota, U. S.A., 2nd January, 1917; 6 years. Filed 11th November, 1916. Receipt No. 271,-912.

Claim.—In a wrench of the class described, the combination of a shank having a fixed jaw, said shank provided with a longitudinal slot extending from a point adjacent said fixed jaw, rack teeth formed upon the rear side edge of said shank, a sliding jaw mounted upon said shank, said sliding jaw provided with enlarged parallel side portions embracing the said surfaces of said shank, each of said side portions being provided with a shallow internal notch adjacent its outer end,



No. 174,289. Wrench.

whereby said notches will be formed in alignment with each other, means passing through said side portions and said slot for slidably retaining said sliding jaw upon said shank, thereby preventing said sliding jaw from having pivoted move-

(Continued on page 32.)



THE DIFFERENCE IN PUMPS

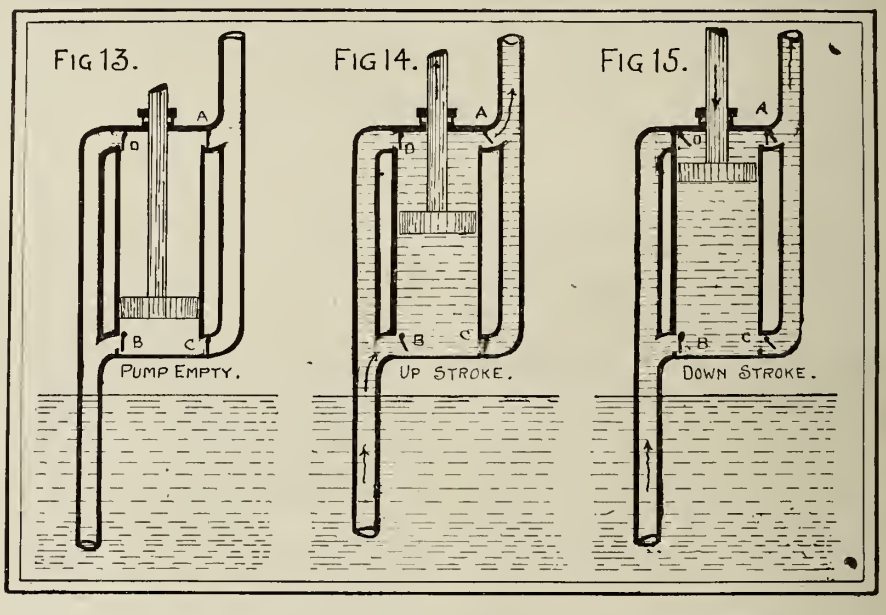
The accompanying illustration shows a somewhat different type of pump than has been described in previous issues under the above heading.

All of which were various types of single acting pumps. The pump shown is a double acting type, viz.—a pump that will deliver water at either upward or downward stroke, while the leathers are not described in the sketch, it is common practice to fit two cup leathers to each piston, one leather looking up, the other down. Fig. 13 shows the pump at rest, before being filled with water. Now turn to Fig. 14. The pump is shown with the piston travelling in an upward direction. It will be noted that valves A and B are open, thus enabling the water to be forced through the opening at the top of pump or rather expelling the water which is on the top of the piston.

At the same operation the lower part of the piston is drawing water from the well, or source of water. It must also be noted that while the upward stroke opens valves A and B, it also closes valves C D, actually exerting a pressure against them, holding them tight. It would appear that the piston when moving upward does not act upon valve C, but it does, first by suction, and second when forcing water up through the delivery pipe.

Now turn to Fig. 15. The motion of the piston is reversed. Still water is being forced up the delivery pipe as well as being drawn up the suction pipe, but note that the water is being drawn up through the top open of the pump, where valve D is fitted, and forced up the delivery pipe through bottom opening in the pump at valve C.

The sketch does not show air chambers on the delivery pipe in this case, but by turning to Fig. 12 on page 40 of the last issue it will be seen how this is fitted. Of course, the air chamber would not be necessary if the water is simply being lifted into an open cistern close to the pump. But if the water is being forced to any great height, an air chamber would be required. Many manufacturers fit air chambers to all types of force and lift pumps, whether single or double acting. But the air chamber is not always needed. For example, supposing a pump of almost any type is delivering and forcing water into a pneumatic tank which is situated close up, no chamber would be needed then, simply because of the fact that the tank is really an air chamber. The water is confining air in the upper portion of the tank. Thus this confined air will take the shock by acting as a cushion, just as does the confined air in the ordinary air chamber.



(Continued in next issue.)

IMPERIAL OR U.S.A. GALLONS

Editor SANITARY ENGINEER. I have here a couple of questions on which I would like your opinion:

(1). Which standard gallon, the Imperial or the U.S. or wine gallon is the standard for Canada? In most of the books dealing with engineering, in all pumps and water-supply calendars, etc., I observe that the U.S.A. gallon seems to have the preference. Why is this?

In connection with water supply, a tank, for instance, is said to hold so many gallons. My impression is that this is usually figured in U.S.A. gallons. Is there any particular case in which one has a preference over the other? I would like to be enlightened and put straight as to this matter.

(2) What in your opinion is the standard amount of water that should be allowed per person per day in a rural home where all conveniences are used? Have you any actual data on this point? An answer to these questions will be very much appreciated.

R. R. G. G.

With reference to the question as to which gallon is the recognized gallon in Canada, we might say that the Imperial gallon is the legal measure in the Dominion, and in fact, in all colonies under the Union Jack. It is the legal measure by which all liquids are sold such as gasoline, turpentine, oils, paints, etc. We also recognize the wine measure, in the wine business.

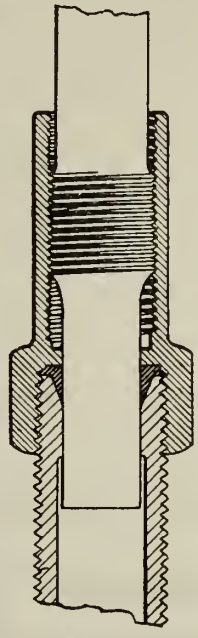
In connection with all engineering however, such as capacity of pumps, pneumatic tanks as well as windmill or other storage tanks, the U.S.A. measure is used, though not necessarily recognized as a legal measure. The reason is that there are so many concerns which make all manner of pumps and tanks in the U.S. our steel plate are rolled and cut to U.S. dimensions etc., that as en-

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(Letters Patent No. 162,577)



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SARNIA, ONTARIO

QUESTION BOX

(Continued from page 30.)

gineers we have as it were naturally taken to the measurements and sizes of their tanks for convenience.

Regarding pneumatic water supply tanks they are not sold in either Canada or U.S.A. as holding so many gallons, but rather by size, viz:—24 inches by 6 feet, or 36 inches by 8 feet and so on.

As to amount of water used per person per day in a rural home, there are no actual data in existence to our knowledge. The only information we have is from common observation and actual experience, in a number of cases.

The writer has however, taken a few cases as examples to go by. For instance, in two cases where hand systems were in use, one a village home where the son did the pumping, only 12 gallons per person was used, there were sink wash bowl, w.c. and bath, and for several weeks the 12 gallons per day on an average seemed to serve the purpose.

The other hand system in use was operated by the hired man, a big fellow who could make a full stroke of the pump, the same number of persons used the conveniences but the requirements ran up to 17 gallons per day for each person.

A gasoline engine outfit was required to pump for a family of 7 with the same type of a bathroom and kitchen sink, 18 gallons per person each day, though some days these people actually used 25 gallons per day, per person, at a later period, the only difference being that a son and daughter from College came home, and somehow got the family into the habit of using more water.

The last experience the writer had, was where a city family took to farming on account of the father having to take a change of work. An electric pump was installed and this family used nearly 50 gallons per person per day. This was proved by having a small electric float and switch placed in the dosing chamber of the septic tank. The reason the writer found this out was because of there being trouble with the field tile absorption bed which was flooded and at too frequent intervals. The tank was increased in size and larger field tile area provided. So that it will be seen that there are varying circumstances which govern the question as to amount of water used per person. It all depends upon the type of system and habits of the occupants of the home. From experience and consulting the various manufacturers of pneumatic water systems, we are led to believe that from 15 to 25 gallons, with say 21 gallons as a happy medium per person per day would be about right.

These figures however, do not allow for lawn sprinkling. It is estimated that during the summer months a lawn requires about ¼ of one inch of water per week including any rain fall that comes. —Editor.

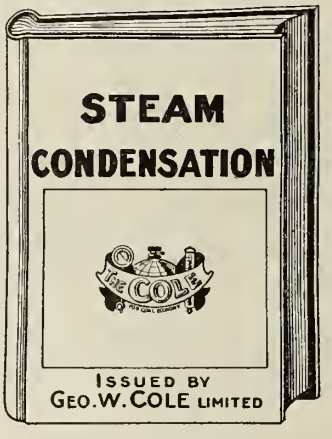
NEW CANADIAN PATENTS

(Continued from page 29.)

ment an adjusting lever having spaced ears embracing the side surfaces of said shank, said ears fitting within said internal notches and pivotally engaging said means, whereby said lever will be retained in engagement with said sliding jaw, said lever being provided with internal rack teeth, said lever being adapted to be swung so as to cause the teeth thereof to disengage or engage said rack teeth of said shank when it is desired to move said sliding jaw or retain the same in a set position, said side portions of said sliding jaw being adapted to guard said ears of said lever, whereby said ears will be protected from injury when in use.

NEW FOOT VALVE

The "Q" foot valve is being manufactured by the National Equipment Co., Limited, 1 Wabash Avenue, Toronto, Ont. It is claimed for it that it is simple and safe. It is made of a one-piece grey iron casting with a solid brass seat that bears all the strain. There is a disc of thin flexible leather that it is asserted, make a positive seal to the joint. The greater the head of water, it is claimed, the greater is the certainty that it cannot leak. The company gives a guarantee to not only replace any valves that may be defective, but to send to the plumber three extra valves as a compensation for his time in installing any that may turn out defective. It is also claimed for it that it is air tight, reliable and cheap.



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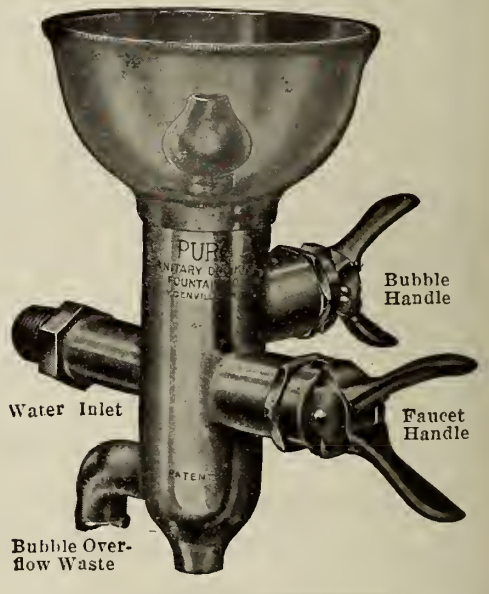
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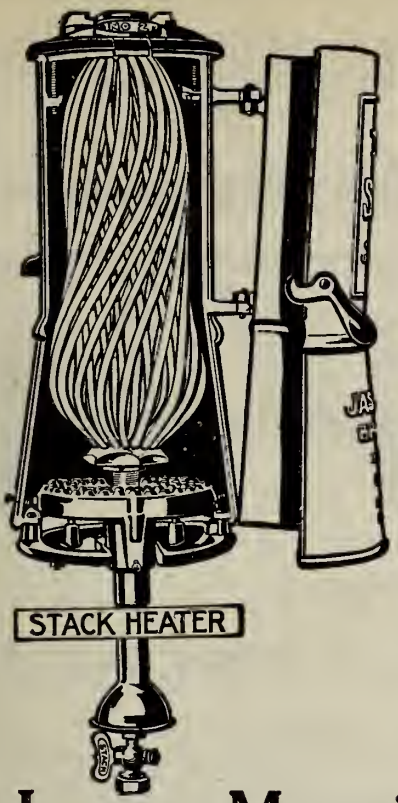
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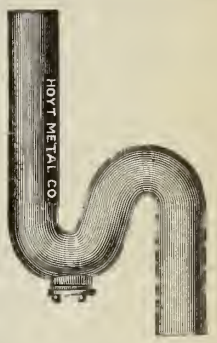




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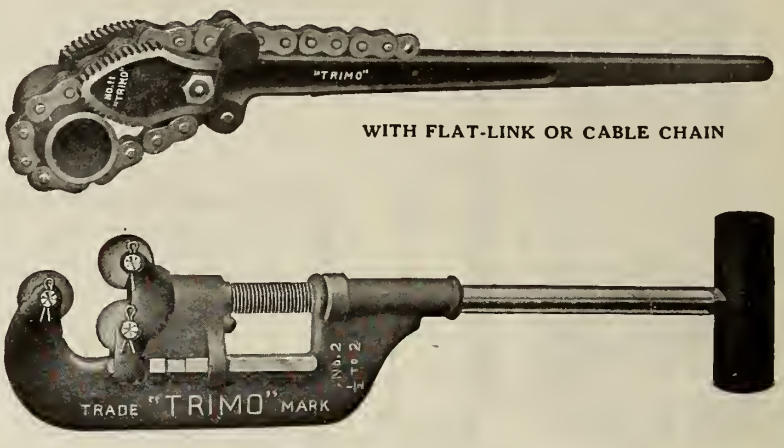
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because we guarantee every boiler to live up to the claims we make for them. We assist you to build up a lasting reputation that counts, when we supply you with our goods.

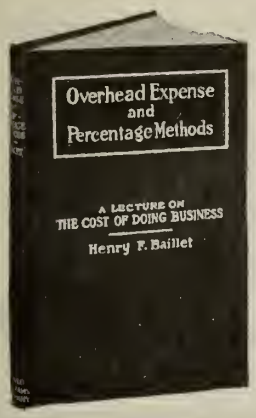


STEEL AND RADIATION, LIMITED

Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

HEAD OFFICE: Fraser Avenue, TORONTO

How Do You Figure Your Overhead Expense?



Many Sanitary and Heating Engineers find at the end of the year they have lost money when they figured on making from 10 to 25% profit. Why? Because they did not know what it costs to do business. They did not include all the little items which make up correct overhead expenses, and therefore did not charge a proportion of these items in their estimates.

Baillet's Overhead Expense and Percentage Methods is based on data taken from *actual business experiences.* Shows how to figure properly the cost of doing business and the correct percentage of profit on any contract.
128 pages. 4½x7 inches. 24 Tables. Cloth. Price $1.00 Prepaid.

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Joseph Breeden & Co., Ltd.

NEW MILL WORKS

Fazeley Street, Birmingham, England



MANUFACTURERS OF

HIGH CLASS

Steam and Water Fittings



Beaver Die Stocks

Full Thread at One Cut

with the

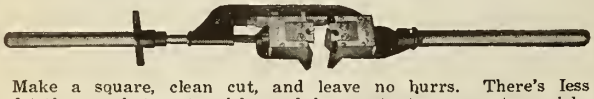
"Beaverette"

A Compact and Complete Tool

NO CHANGING OF DIES—NO BACKING OFF—NO LOOSE BUSHINGS. These are some of the advantages of the "Beaverette" not found in any other tools. Cuts from ⅛ to 12 inches.

One man can cut a 12-in. thread easily with our tool.

Beaver Pipe Cutters



Make a square, clean cut, and leave no burrs. There's less friction on hot water jobs and less wet steam on steam jobs when the Beaver square-end pipe cutters are used.

Manufactured by

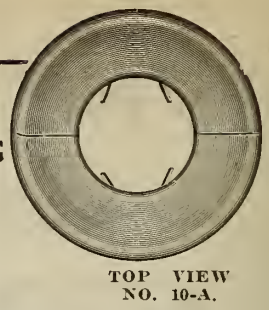
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Toronto, Canada

"BEAVER"



OPEN VIEW
NO. 10-A.

The CEILING PLATE that's better



TOP VIEW
NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.



Gem No. 4.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

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WROUGHT PIPE

BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.

All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

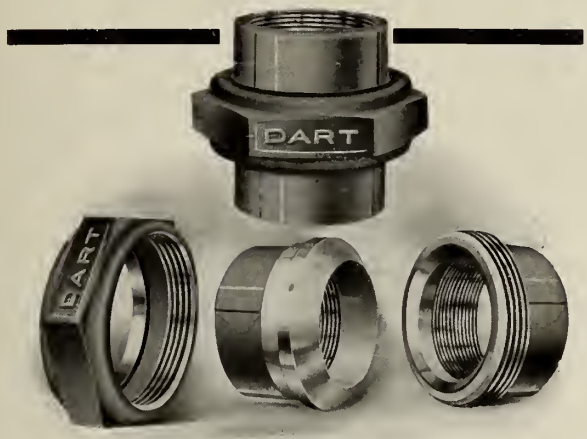
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MR. SANITARY ENGINEER.—Do you believe in giving a thing in exchange for something of greater value? Of course you do. You want to help us if we help you. The small sum which we receive for your subscription is only one-tenth of the value that you receive in 24 issues of "THE SANITARY ENGINEER." You must have the articles advertised in "THE SANITARY ENGINEER" in order to do first-class work. Then why not buy from the firms whose names you see appearing regularly? We personally investigate the merits of all the articles advertised in SANITARY ENGINEER, and thus give you a double service, namely, by bringing them to your attention and guaranteeing their reliability.

THINK THIS OVER when ordering your next lot of supplies.

The Part of a Pipe Line That Never Leaks



DART UNION PIPE COUPLINGS

are permanently efficient because both faces are

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No Deterioration

Iron Parts Are Heavy

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And they are easily connected whether pipes are in or out of line.

Dart Union Pipe Couplings never bother customers and they save you much time, labor and worry. There is a "Dart" for every need.

YOUR JOBBER SELLS THEM

Manufactured by

DART UNION CO., Limited

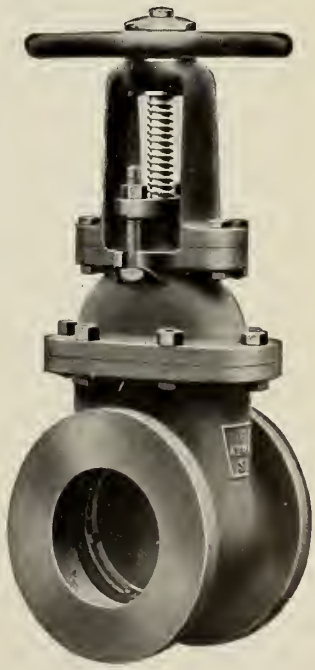
TORONTO, CANADA

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

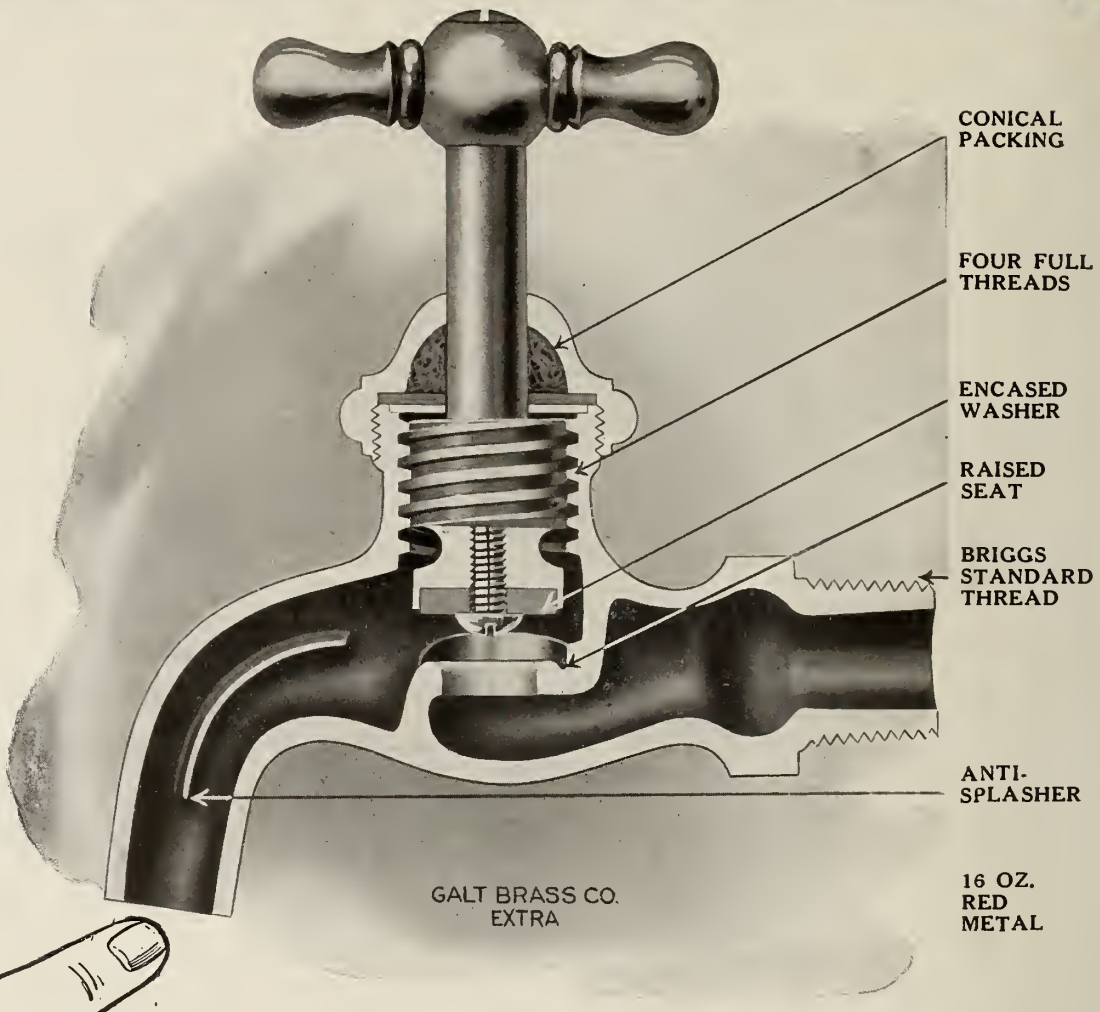
Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

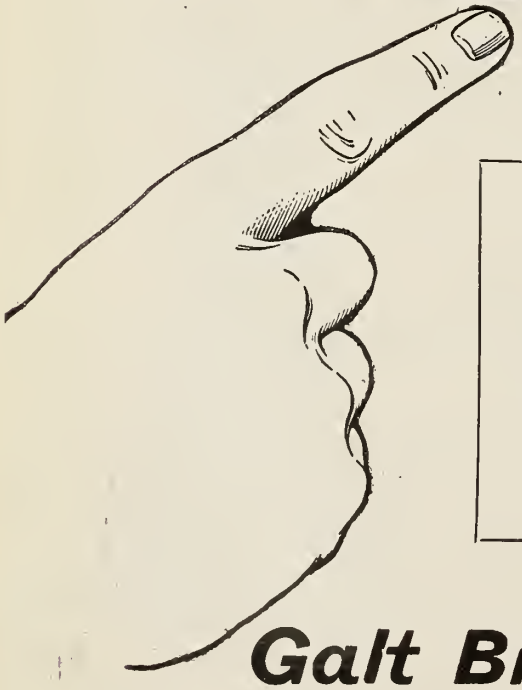
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THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Registered **PERFECTO** Trade Mark

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, SEPTEMBER 1, 1917 | No. 17

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FULL WEIGHT METAL

EMPIRE VALVES

THE EMPIRE LINE

Look for the letter E when you want to be sure of Excellency in design, Excellency in service and Excellency of quality.

Every valve made by us bears the letter E, and will withstand all that is required of such valves.

Accurate Threads

Look for the E on every Valve





When you buy radiator valves they should be properly designed. Many are there on the market that look alike, but do not work alike, do not stand the strain put upon them, and have not the uniformity of combinations that go to make up a Valve of Quality.

Empire Mfg. Company
LIMITED

LONDON ONTARIO - TORONTO ONTARIO

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TIP-TOP QUALITY

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

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RUBBER SYSTEM
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Service First

Nothing can impress a purchaser more favorably toward any article than the assurance that it will give satisfactory service. That explains why the Dominion Rubber System has gained such a strong hold among purchasers of rubber supplies.

Each Dominion Rubber System product, no matter what its use, is made to "stand up" under the severest tests. A half century's experience in manufacturing everything in rubber has taught us to know "what's what" in rubber and how to make a finished product that will give satisfactory service.

The surest way to prove our claims is to put us to the test. Our nearest branch will give your requirements prompt and intelligent attention.

Canadian Consolidated Rubber Co.
Limited

Head Office - - MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Brandon, Regina, Saskatoon Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

WE SPECIALIZE

In the Manufacture of

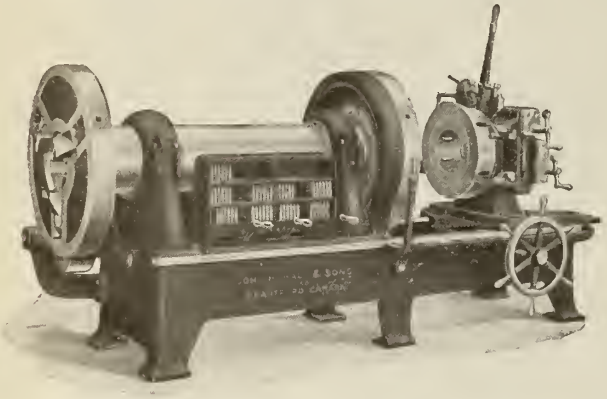
CAST IRON SOIL PIPE and FITTINGS

as well as

GALVANIZED RANGE BOILERS AND EXPANSION TANKS
FOR HEATING SYSTEMS

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Pipe Machines of Merit



THE HALL No. 8

Duplex Improved Gear Box Driven. Capacity 2½ in. to 8 in. inclusive.

Note the drive belt at rear out of operator's way. Elevated die cabinet, control lever and speed levers all convenient to operator's right hand. Sliding die head.

These machines are equipped with a friction clutch, enabling operator to revolve pipe a few inches, if necessary.

Pipe Machines ranging from ⅛ to 18".
Nipple Machines ranging from ⅛ to 4".
Roller Pipe Cutters ranging from ⅛ to 4".
Delivery from stock.

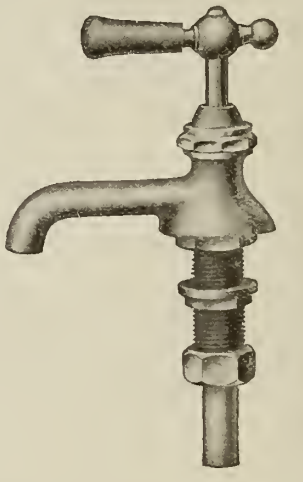
Write us for full particulars and prices.

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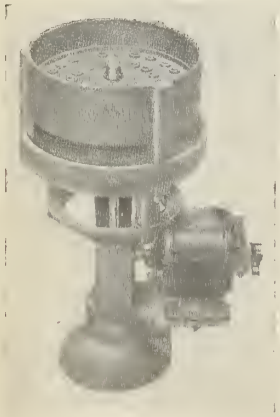
Fazeley Street, Birmingham, England



MANUFACTURERS OF

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Steam and Water Fittings



NEW DIFFERENT BETTER

The cost of coal is a serious problem to-day. Your customers have all tried to solve it and failed. We have tried and succeeded.

ROTARY OIL BURNER

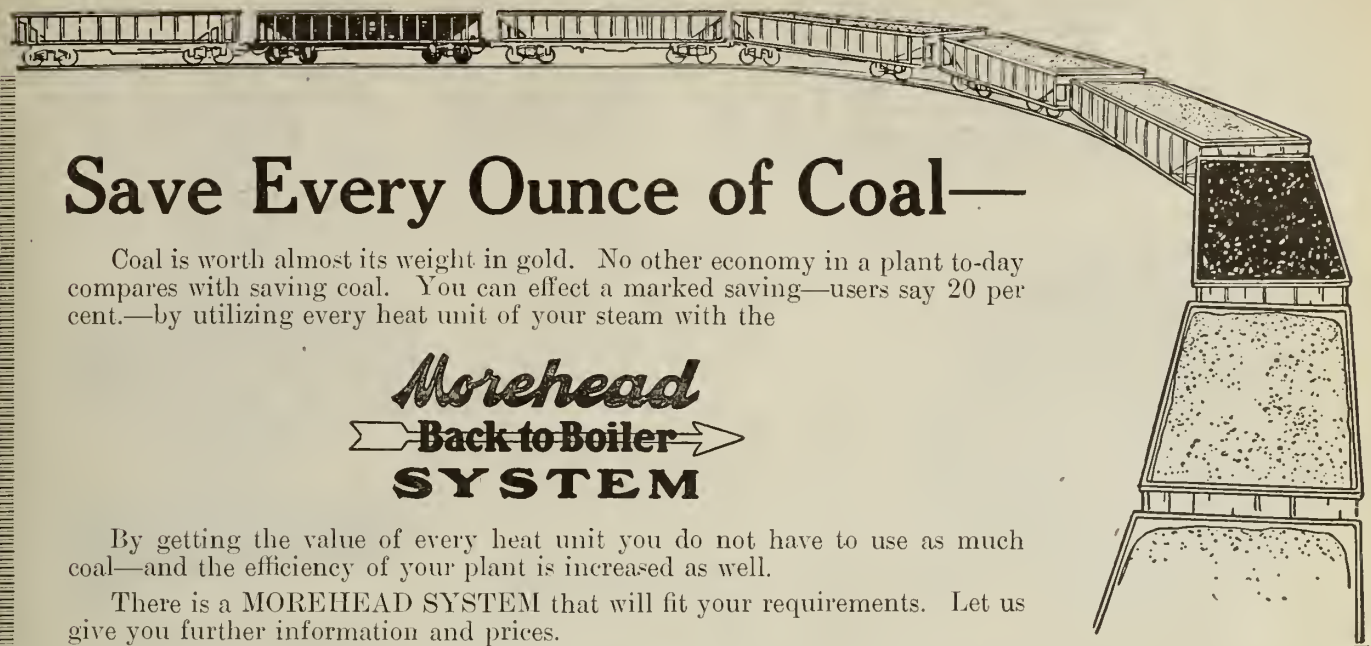
is the result of our labors. It burns fuel. oil, or kerosene. Can be installed by any plumber. Works in connection with present heater. Installed in the fire-box, gives a terrific fire in a few seconds. Can be turned off instantly when not needed. No trouble to take care of. Big profits for the plumber and an unlimited field.

NATIONAL ROTARY OIL BURNER COMPANY

235 Congress Street, BOSTON, MASS.

PROGRESSIVE REPRESENTATIVES WANTED EVERYWHERE.

Save one out of five Cars



Save Every Ounce of Coal—

Coal is worth almost its weight in gold. No other economy in a plant to-day compares with saving coal. You can effect a marked saving—users say 20 per cent.—by utilizing every heat unit of your steam with the

Morehead
Back to Boiler
SYSTEM

By getting the value of every heat unit you do not have to use as much coal—and the efficiency of your plant is increased as well.

There is a MOREHEAD SYSTEM that will fit your requirements. Let us give you further information and prices.

The Canadian Morehead Mfg. Co.

Dept. "C"

WOODSTOCK, ONTARIO

Ⓚ Basin Cocks

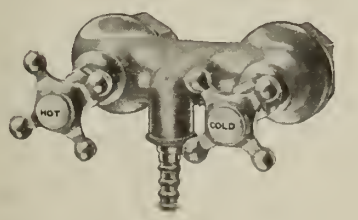
NICKEL PLATED



4-Arm China Index Handles. Length of Spout, 3¼-in C. to C. Stuffing Box, Incased Washer, Ground Joint. ¼-in. I.P. Male Thread.

Ⓚ Double Bath Cocks

NICKEL PLATED



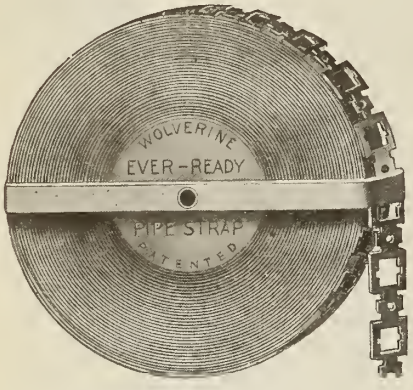
4-Arm China Index Handles. N.P. Tails Screwed for ½-in. I.P. 3⅜-in. C. to C.

Good Design, Good Material and High-Class Finish

We have these Cocks in stock and can make immediate shipment. Send for Prices.

T. McAvity & Sons, Limited St. John, N.B.

Hang Any Size Pipe with
EVER-READY PIPE STRAP



In Coils of 100 feet

The Simplest Pipe Strap on the market.

"No Cotter Pins" necessary.

The weight of Pipe automatically locks Strap.



Durable and Economical

Canadian Wolverine Co., Ltd., Chatham, Ont.

ONE MAN DOES WORK OF TWO
WITH THE
"Jardine" and "Toledo" Pipe-Threading Tools



"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of "**JARDINE**" OR "**TOLEDO**" DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear, too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

WRITE FOR CATALOG OF COMPLETE INFORMATION.

A. B. JARDINE & CO.
HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.

Service-Speed-Economy



The Hotstream WATER HEATER

BEST FOR BAD WATER

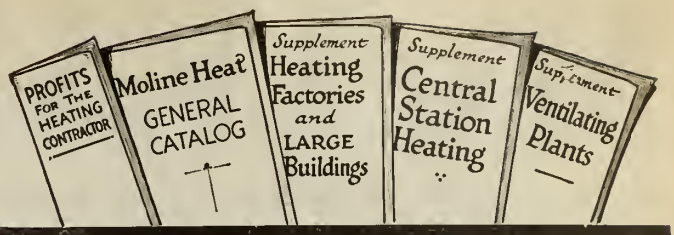
Quality Survives

Also Made With Cast Iron jacket.

The Hotstream Heater Co.

CLEVELAND, OHIO

W. H. CUNNINGHAM, 98 Kingswood Rd,. TORONTO
Canadian Representative



These Valuable Books *Free!*

Each one is worth big money to you. Every heating contractor should have them. They cover all the latest money-making ideas in figuring and installing steam heat—hot water heat—vapor heat—and vacuum systems.

These books will help you to land more orders and increase your profit on every job. Write for them at once. They are absolutely *FREE!*



Moline Illinois

THE CRANDON NO. 42 TANK TYPE THERMOSTAT



is a thoroughly reliable automatic control for hot water.

The thermostatic bar comes in direct contact with heating surface of tank or pipe, insuring perfect control.

Attractive discounts.

Write for booklet to-day.

DARLING BROS., LTD.
MONTREAL, CANADA

BRANCHES: TORONTO and WINNIPEG
Agents:
HALIFAX, ST. JOHN, CALGARY, VANCOUVER

"B & C"

COMBINATION
Floor and Ceiling PLATES



No. 10 Steel
3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

Send for catalog of complete line.

MANUFACTURED EXCLUSIVELY BY THE
Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:
W. H. CUNNINGHAM, 98 Kingswood Rd., Toronto, Canada.

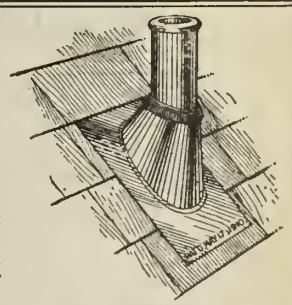
IT IS IMPORTANT!

If you have something to dispose of in goods or service that as many buyers as possible get to know you and your product. This can be accomplished through

Sanitary Engineer

143 University Avenue, Toronto

The "Simplex" Roof Flashing



The shape of the sleeve makes it possible to fit any pitch roof from 50° to flat. Made of very best galvanized iron or copper with pure lead collar. This is the simplest and best adjustable roof flange on the market.

Ask your jobber to supply "Simplex" on your next order.

SIMPLEX SALES COMPANY

313 Clinton Street CHICAGO, ILL.

Canadian Representative: W. H. CUNNINGHAM,
98 Kingswood Road TORONTO, ONT.

MACLEAN'S FOR SEPTEMBER

is a magazine of the very best type and rank. It is made for Canadians, and so has a value and appeal to Canadians possessed by no other magazine in the world. MACLEAN'S circulation is getting greater each month. It is now 50% larger than a year ago. The inference is inevitable.

Northcliffe

Lord Northcliffe will be a contributor to the September MACLEAN'S. The general theme of his article will be Canada's position at the present time in relation to the war and to the Empire afterwards. Be sure to read what the brilliant and dominant man has to say about our country. Get an outsider's viewpoint.

MacLean

John Bayne MacLean, publisher, editor, publicist, clear-seeing and far-seeing, has another strong article in the September MACLEAN'S. Colonel MacLean has proved himself to be as clear-sighted as Kitchener in many matters pertaining to the present war; and he is doing a needed work now in THE FINANCIAL POST and other newspapers, to arouse Canadians to a proper sense of the perils that lie ahead.

Ronald

Another smuggling revelation!

A certain Canadian town offered a big bonus to a factory. An American supplied the desired factory, smuggled into Canada the whole plant required,—and was afterwards found out and brought to book. J. D. Ronald tells the whole amazing story in the September MACLEAN'S. Mr. Ronald is contributing to MACLEAN'S a series of Canadian "inside" smuggling stories—true ones. This is great stuff.

Leacock and Laut

Stephen Leacock and Miss Agnes C. Laut are contributors as usual to the September MACLEAN'S. Leacock's humor is bubbling, sparkling and refreshing—like spring water. Miss Laut provides another of her well-informed vigorous, and revealing articles on a phase of the war in relation to Canada and the United States. Miss Laut makes us think and wonder!

Jacobs and McGrath

W. W. Jacobs contributes one of his inimitable short stories to the September MACLEAN'S. "Their Wives Went Along." Harold McGrath, world famous story-writer, who wrote "The Man on the Box," provides a complete novelette. It is a story of adventure and mystery.

Allenson and Moorhouse

A. C. Allenson contributes a short story, "A Flutter in Diamonds;" and Hopkins Moorhouse, "Their Tents like the Arabs." These two men are Canadians—winning fame, and adding lustre to Canada's record for producing short story writers of the first-class.

Hendryx

James B. Hendryx's serial, "The Gun Brand," continues in the September MACLEAN'S. A great story of the Canadian Northwest. The Movie-makers are filming Hendryx's work. So you can be sure that he's writing the right sort of stuff.

Women and Their Work

This is the title of a new department in MACLEAN'S. In the September issue, this department will contain:

Reducing my household cost.

The Care of the Child—an article by Dr. George E. Smith.

A sketch of Mrs. W. M. Davidson, a prominent Western woman, engaged with her husband in editing the Calgary Albertan.

Cooking the Cheaper Cuts,—an article on economy in the kitchen.

This new department will prove of first-class interest to all women.

Review of Reviews

One of the best liked and most valuable features of MACLEAN'S MAGAZINE is its Review of Reviews Department where the best and most significant articles appearing in current literature are condensed for the busy reader, and for the one who wants to know what other magazines are printing. Here one gets a cross-section of the world's best thought.

At All Newsdealers 15 cents

"Standard"
"Perfection" Built-In Baths

Made in One Piece Enamelled All Over



These Baths represent the last word in design and finish, and are made to build into Right or Left Hand Corner or into a Recess.

The "Perfection" Built-in Bath is only 17½ inches high, therefore convenient. It builds into walls and floors, the absence of all dust-collecting cracks and corners, meaning bathroom sanitation.

Made in 5 and 5½ foot sizes.

Illustrations on request.

Write the nearest dealer.

Standard Sanitary Mfg. Co.
Limited

General Office and Factory, Royce and Lansdowne Aves., Toronto, Ontario

Toronto Store:
55-59 Richmond Street East

Winnipeg Showrooms:
76 Lombard Street

Hamilton Store:
20-28 Jackson Street West

Montreal:
4 Beaver Hall Square

Calgary:
31 Canada Life Building

Vancouver:
847 Beatty Street

"MADE IN CANADA"

A Straight Talk to the Advertiser

HOW ADVERTISING PROTECTS

A CERTAIN Canadian manufacturer recently received a long distance telephone message, asking him to quote on a lot of equipment required for a certain big undertaking. He caught the first train for the city in which the inquiry originated and as a result closed an order for over $50,000!

This manufacturer took the trouble to come into our office one day this week and frankly told us of the circumstances under which the order referred to had been secured. It developed that the manufacturer in question knew absolutely nothing about the tender being out and it was solely through the appearance of a full page advertisement in one of our papers that he received the inquiry which resulted in the order for $50,000.

Here was a manufacturer, a keen wide-awake man, with a supposedly efficient sales organization, equipped for keeping in touch with all worth while developments. Had this manufacturer relied solely upon his sales staff he would have lost out but, as we said before, being keen and wide-awake, he had provided for just such contingencies by *advertising*.

Advertising—the salesman who is everywhere at all times, who never sleeps, who is ever on guard,—proved his worth in this case just as he has shown his mettle so often before.

Even in this instance advertising might not have received the credit for the splendid results secured had not our good friend and advertiser taken the trouble to ascertain just how and why he received the inquiry which led to the order.

Naturally the manufacturer in question asked us for obvious reasons to refrain from mentioning any names at the present time, but the facts were so interesting that we felt impelled to pass them on that a consideration of them might strengthen the already unwavering conviction of those who have advertised long and believe fully in the power of advertising, and encourage those who are almost but not quite convinced that advertising is a necessary force in business. And there are still a few in this state of mind.

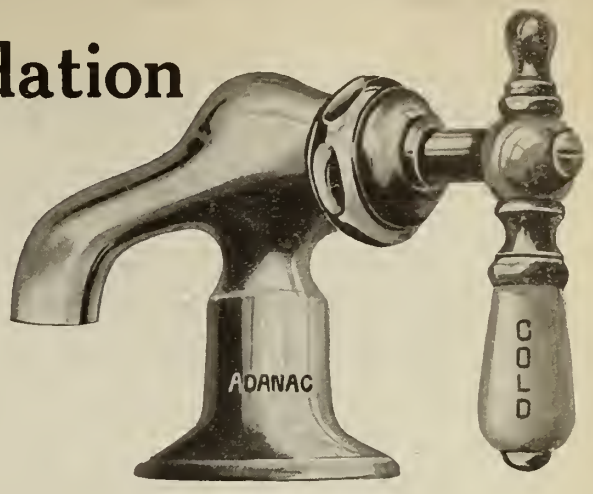
THE SANITARY ENGINEER
143-153 UNIVERSITY AVENUE TORONTO

Built on a Rock Foundation

Commercial instinct of every sanitary engineer leads him to seek for PERMANENT BUSINESS, built on a rock foundation. There is but one road to it —that's the road of QUALITY.

C. B. Brass Goods Pave the Road of Quality and Make the Trip Easy

Quality invariably indicates service — the quality of C.B. products stand for MATCHLESS SERVICE. Then they have a highly attractive finish.



TRADE B.O.T. MARK

The Canadian Brass Co., Limited, has taken over the business of the B.O.T. Mfg. Co. of Toronto. If there is any room left for improvement in these celebrated lines the C. B. Co. can be relied upon to effect it.

We can meet the fullest and most exacting requirements of any sanitary engineer. Our Brass Goods are made of full weight red metal—special formula. All lines are carefully inspected to insure maintenance of high standard before leaving factory.

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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, SEPTEMBER 1, 1917 No. 17

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EDITORIALS

Rural Sanitation—Serve Canada

The MacLean Publishing Co., Limited

JOHN BAYNE MACLEAN, *President* ESTABLISHED 1887 H. T. HUNTER, *Vice-President*
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SANITARY ENGINEER

VOL. XI SEPTEMBER 1, 1917 No. 17

Our Profession and Society

Being a Paper Read at the Last Convention of the American Society of Sanitary Engineering, Aug. 1-2-3 Grand Rapids, Mich.

By
Arthur Bateman, chief of the Sanitary Department, American School of Correspondence.

IT is well at these annual meetings to do a little stock-taking, to review the situation in regard to the subject matter with which our Society is engaged, to verify our bearings, to keep our minds constantly open to receive new truths, to be ever ready to reject the false, the obsolete and the effete, but at the same time not to assume that the latest thing in science, or in anything else, is necessarily the last or the best, nor lightly to reject the earnest testimony of far-seeing, disinterested, and thoughtful men, even though of an earlier epoch than our own.

On this occasion, I will not endeavour to explode any old theories, nor expound any new schemes which will revolutionize the profession, but I will content myself by merely touching upon a few topics which I hope will evoke a spirited discussion, keeping well before me the famous couplet:

"One man's word is no man's word,
Justice needs that both be heard."

Why are we holding this meeting in Grand Rapids to-day? What is the value or good of all this scientific investigation and practice work with regard to Sanitary Engineering? In other words, "Does Sanitation Pay?" The answer is not far to seek. Historical records tell us that sanitation began with the civilization of man. We even find from Biblical records that Moses enunciated some forms of such. However, the whole world has had to be taught her lesson before she grasped the imperativeness and greatness of sanitary engineering.

Rome, Athens, Tyre, and many of the great cities fell from their proud place through pestilence brought about by unsanitary conditions.

In the year 165, the Romans were clustered together in castles and walled cities. They wore the same clothing for a lifetime. They threw their garbage out of the window on to the unpaved, narrow and sunless alleys, and drank the water from polluted streams and wells dug in vilely contaminated soil. The price they paid for their ignorance of sanitary engineering was a fifteen years' plague and uncountable lives.

Vile and inconceivable sanitary conditions existed in London, England, up to



PROF. A. BATEMAN.

the year 1665. Thousands upon thousands overworked, half-fed men and women were cooped up in unhabitable houses. They turned their sewage into the greatest of all sewers, the River Thames; they drew out the sewerage water to drink. These conditions, coupled with vitiated air and unsanitary streets, cost London 100,000 lives out of a total population of 500,000 in a little over a year.

New York City will long remember the cholera epidemic in 1849, when over 10 per cent. of her population perished, yet many of the lay people, in their ignorance, still continue to cry "Does Sanitation Pay?"

Perhaps the most direct reply to the question is an examination of the death-rate, which has certainly fallen most remarkably.

In the year 1854, Chicago had no sewers, but a mortality rate of 60 per 1,000. To-day it is only 14 per 1,000. Thirty years ago in New York City, they had a mortality rate of 27½ per 1,000, while to-day it is only a trifle over 14 per 1,000. In Philadelphia thirty years ago, 22½ per 1,000, now 15 per 1,000. In Boston thirty years ago, 25 per 1,000, now 16 per 1,000.

These figures show beyond a shadow of a doubt what a gain to the country in the money value of life these statistics indicate. But, beyond this, there is the increased efficiency of the popuation, a higher standard of health and of general well being, all of which go to show that sanitation has been well worth the trouble and expense that has been devoted to it. In all this, we, as Sanitary Engineers, may justly claim to have had our part and may be proud that our life work lies in such a beneficient direction.

Of course, we are not egotistical enough to claim the entire credit for these wonderful results. Modern surgery, suitable drugs, and adequate nursing have played no small part in bringing about such a pleasant state of affairs. Notwithstanding, the sanitary engineer, with his preventive measures, will always take precedence over the most efficient cures.

The question now arises: Will we be given the money and power to continue with our good work? Will the public remember that sanitary engineering enabled the Panama Canal to be built, by eliminating yellow fever from the Canal zone? That it has banished the deadliest enemy—disease—in the world's great war? That it has brought greater convenience and hygienic conditions to millions of homes in the cities, towns and country? Will they think of the health, comfort and happiness it has given to millions of our factory, office and store workers?

Will those responsible for the government of this country remember that it has lowered the death-rate sixty per cent. in sixty years?

Will they, during this colossal war, allow us to rise to the greatness of our privilege, qualify ourselves, and work, that victory may be on the side of humanity, and not on that of decay and death?

Any answers to these questions cannot help but be problematical at this time. Very shortly after the outbreak of war, it becomes evident that the cost thereof will be colossal, and that municipal economics should be enforced. Already we have had many suggestions with regard to economizing, and, as business men, we have to discriminate between what is only sentiment or inconvenience and what may constitute a danger to health.

Personally, I think our first object should be to maintain the health of the civil population in as high a state of efficiency as possible, in order that our industries may be kept going at full speed, our economic position upheld, and the supply of recruits to the army not interfered with. This is war work of the most important kind, and its importance will grow with the length of the war.

Of course, if the war is going to be over in a few months, we can neglect everything in order that our whole energies may be directed to military purposes. But if the war is very prolonged, the condition of the civil population becomes a strong determining factor.

At first sight, it appears that the war cannot last many months longer, yet the well-informed are making preparations for a long drawn-out struggle. If their contentions become a reality the sanitary engineering profession will be hard hit, for the money we have amassed will go in unproductive expenditure. Productive expenditure of capital or labour is that which is expended upon subjects that bring in a return, equal to or greater than the amount expended upon them. In this sense, money spent on a shell that is useless after it has been fired is unproductive, while money spent upon seed that raises a crop is productive.

Again, when the gigantic struggle is over and a financial balance sheet is drawn up, it will be found that wealth representing fabulous sums will have been lost through loss of trade, through the withdrawal of thousands of men from productive industry, and through the deplorable loss of life of thousands of men, many of whom possessed knowledge and skill of inestimable value.

Taking a pessimistic view of the situation and assuming that we have to face a war of three or more years' duration, it will be imperative to find ways and means of economizing without lowering in any perceptible degree the present standards of municipal sanitation.

This is more easily said than done, because materials, cartage and wages have increased very considerably. Again, our best men will be somewhere in Europe, and labour, though dearer, will produce less results. Still further, in our own camps, the water supply and scavenging has to be increased. New and larger sewers are necessary. There is a larger bulk of sewage to be dealt with, while the roads and streets are suffering through the increased burden of traffic.

Although discouraging for most of us, it will be compulsory to temporarily suspend the building of the long-needed comfort stations in many of the cities. Drafting possibly 2,000,000 men to Europe will not make the demand for these as imperative as formerly.

Much expenditure can also be eliminated in public parks, pleasure grounds, public baths, etc.

Most of the contemplated new sewerage systems can be delayed until the crisis is over.

Roads can be kept intact by spraying with tar.

Strenuous efforts should be enforced to avoid all waste of water.

All plumbing machinery for water supplies and sewage disposal systems should be thoroughly overhauled and brought up to its maximum efficiency.

Vegetables of all kinds can, with advantage, be grown on many sewage farms.

All waste paper, bottles, tins, old iron, etc., should be strictly conserved.

In those health and plumbing inspectors' offices where the reports and notices run into hundreds a day, a cheaper and lighter grade of paper can be used and both sides of the paper written on.

However, the mere fact that it becomes necessary to economize in sanitary procedures must in no way lessen our ardour in our work, nor in the work of the Society. Let us adapt ourselves to the prevailing conditions and review our energies along new lines, so that we will continue to conserve and preserve the health of the public and serve the United States as loyally as though we were actually in the first trench in Europe.

It is generally agreed that the sanitary conditions now prevailing in the United States are superior to those of any other country in the world, and the American Society of Sanitary Engineering merits numerous congratulations, for it is its members who have been the dynamic force, the moving spirit in championing the sanitary codes and digging below the surface and unearthing many beneficial procedures which have conserved and preserved the health of communities.

Main House Trap and Breather Problem

No Subject Has Proved More Interesting Than That of the Main House Trap and Breather—We Publish Herewith a Few of the Many Replies We Have Received in Answer to a Number of Letters Recently Sent Out.

THIS question of the main house trap and breather received a good deal of attention at the recent convention of the American Society of Sanitary Engineering held in Grand Rapids, and some splendid addresses were given. The report in full will be published in a future issue.

Many were there who championed the main house trap, but they were the old guards in the profession.

At the same time there were a still larger number who were in favor of eliminating it.

Those however who favored the main house trap do not appear to grasp the situation in its most logical and natural aspect.

They are no doubt earnest and feel their responsibility, but here is the point as we have put it many times in SANITARY ENGINEER. We have a system of sewers, they need ventilation. If these sewers are not ventilated, then sewer gas will generate and accumulate. But, suppose that the sewers are properly ventilated? What then? What do we mean when we say that "a sewer is ventilated"? We mean in other words, that the atmosphere in the sewers is being changed, renewed, set in motion, etc.

Now, in such a case, how in the name of common sense can a sewer contain sewer gas? Such could only be present if the air or atmosphereic space of the sewers were confined, and no change taking place.

We venture to say that no system of ventilation for sewers, soil, waste and vent pipes can be possibly constructed that will so effectively ventilate said piping as the elimination of the main house trap and breather. To prove our contentions we purpose to show in our next issue what does really take place under varying conditions.

The following is one of the many replies to our letter sent out, from a reader in Transcona, Manitoba. It is one of the most interesting letters we have received and is based upon facts and practical experience. It also proves the contention of SANITARY ENGINEER regarding frost closures on house branches. We advocated several years ago a properly designed man hole cover for use in cold climates, a manhole cover that had not too much opening would answer the purpose.

"In reply to the first question (see facsimile of letter sent out). The answer was, "No, unless there is a large system with house traps in a very cold climate where there is hard weather say 30 to 40 degrees below zero for periods of 2 to 3 weeks duration.

"2nd—In a warm or moderate climate, yes, under any circumstances.

"It allows the gas from the sewer mains to pass off at a high elevation, instead of having to pass off through the man hole covers.

"3rd—House traps on main soil pipes are not allowed except in case of a low building that is close to a high building, where the stack of the low building terminates close to a window in the high building, and then only by special permission.

"I have personally watched results in

our sewer system for the past two winters with no house traps, and have found it so far very satisfactory.

"I have found that there is an inrush of fresh air down through the openings in the man hole cover, and the sewer gas if any passes off through the soil pipe stacks over the roofs of buildings.

"Our manhole covers are specially designed for cold climates, with small openings to check the inrush of too much cold air, which would undoubtedly tend to freeze the main sewer pipes up solid if an excess quantity was allowed to pass the cover.

"With our specially designed manhole cover I have found by personal observation that during hard cold periods the small openings in the manhole cover would automatically close up with hoar frost and effectively overcome the tendency of too much cold air to get into the sewers.

"Mr. W. M. Scott of Winnipeg who is a civil and hydraulic engineer designed our sewer system and it was he who introduced the no-house-trap system in our town.

"Mr. Scott also designed our special manhole cover, our local plumbing inspector was at first very pessimistic regarding the elimination of the main house trap, but after watching carefully the results for two winters, he has now nothing to say in favor of the main house trap, except in very special cases.

"W. S. McGibbons,
Town Engineer."

Continued in future issues

Wells & Newton, New York City, have the contract for plumbing and heating, costing about $500,000 for Union Station for the Toronto Terminal Railway Co., 26 King St. E., Toronto, Ont.

NEW WROUGHT IRON RADIATOR

A new wrought iron radiator is being manufactured by the Kansas City Radiator Co., Kansas City, Mo. It has recently been placed on the market and is illustrated and described in a catalogue issued by the company. The Walker radiator is designed for use with steam, hot water, vapor and vacuum systems, and is the invention of Thomas H. Walker. Among the advantages gained by the new construction are the diminishing of the floor space occupied by the radiator nearly one-third, as compared with a cast-iron radiator; the neat appearance of the new type, and the increase in heating efficiency, without sacrifice of strength or durability. The radiator is made of wrought iron, combined with a copper alloy to make it non-corrosive and rust-resisting. It is sectional and interchangeable, being made without end or leg sections. The legs, which are separate pieces, are also adjustable to variations in height from the floor. An ingenious interlocking device is used in the construction which, it is stated, enables the radiator to withstand high pressures and rough usage. It also eliminates the punching of holes and the use of rivets.

WHAT IS YOUR OPINION ?

Dear Sir--

For a number of years the question of using a main house trap and breather on each private branch drain from a dwelling or building, between a house drain and the main sewer, has been under consideration. Many favor the main house trap and breather, while some favor dispensing with both.

The following are a number of questions relating to the subject, answers to which will be greatly appreciated, and if time will permit, a rough sketch will also be welcomed.

1. Are you in favor of the use of a main house trap and breather ? If so, why ? .....

2. Are you in favor of dispensing with the main house trap and breather ? If so, why ? .....

3. What is the law regarding above subject in your locality ? .....

Signed .....

Address .....

WHEN THE SIPHON COLLAPSED

When the 10,000 length of 10-foot steel pipe collapsed on the Los Angeles aqueduct, the loss of about a quarter of a million dollars was averted by a brilliant engineering feat. As the collapse was caused by a cloudburst that washed out the foundations near the centre, the water gushed out with such force as to cause a vacuum within the pipe. The atmospheric pressure was too much for the quarter-inch steel plates to withstand, and the top fell in, almost touching the bottom in some parts and causing the splendid piece of work to look like a complete wreck, beyond repair.

William Mulholland, the chief engineer of the aqueduct, hit upon a method of restoring it, however, After repairing the break and replacing the foundations at the washout, the water was once more allowed to enter the concave pipe. At first the pressure was kept slight, then as the amount was increased a little at a time, the force of the 200-foot head gradually brought the siphon back into shape. Finally every wrinkle was smoothed out and the great siphon, 10 feet in diameter, came back to its normal cylindrical shape. A little more than $2,000 did the work and that included such repairs as provided against a repetition of the accident. This Antelope valley siphon is said to be the longest of its diameter in the world, composed almost entierly of steel plates. It has a total length of 15,596 feet and forms a link of the Los Angeles aqueduct, which is well toward 250 miles in length.—The Independent.

THE NECESSITY FOR VENTILATION

H. Newell Martin, Professor of Biology in the John Hopkins University, writes in *The Human Body* that the headache and drowsiness which are caused by sitting in badly ventilated rooms, and the want of energy, as well as the general ill-health which result from permanently living in such, are dependent on a slow poisoning of the body by the reabsorption of matters eliminated from the lungs in previous respirations.

On this subject the Encyclopedia Americana says that impure air undermines the health and changes the character of the blood. Suitable ventilation is the free admixture of outdoor air with that of the apartments, but so modified as to temperature and velocity as to prevent drafts which are injurious, for they lower the temperature of the body and produce internal congestions.

ACQUIRED NEW PLANT

Walworth Mfg. Co., Boston, Mass., has purchased the Kewanee plant of the National Tube Company at Kewanee, Ill., the sale being effective July 1. The plant covers an area of 58 acres and employs 2,400 men. All of the company's valves, fittings, etc., for the western trade will be made hereafter at the Kewanee plant, which will be in charge of Charles A. Olson, formerly manager of the Walworth Company's works in Boston. Shirley R. Mitchell, formerly of the company's New York branch, will have charge of the sales. This progressive concern are the maufacturers of the genuine Stillson pipe wrenches.

Brantford Plumbers' Club

First Year Has Proved a Rousing Success — Members Are Working Well Together For the Common Good—President's Address and Financial Statement Makes Interesting Reading.

TO pay a visit to Brantford, to interview the members of the craft in that fair city and to note the true ring in the enthusiasm shown by every member of the above-named club, is to leave the city with the feeling that it is an honour to do business under such conditions as are in the making.

One year or so ago, the Brantford plumbing club took form and every member felt he was a sinner in many ways. The good old orthodox idea of seeing the beam in one's own eye has certainly done good. The following reports from this young organization make good reading, and we hope to hear more in the near future about the club's doings. The secret of the success in the plumbing trade is—well, it's no secret—all up and above board.

That feeling about the other fellow cutting prices, getting ahead of a customer and so on, has too much of the German system about it. Come out into the open, don't be afraid to tell the public that it costs more to conduct a sanitary and heating business than almost any other profession on top of this crusty old earth, and get on top to serve their interest in the broad daylight.

Some of those words are, we feel sure, embodied in the spirit of the Brantford Plumbing Club.

President's Yearly Report

To the members of the Brantford Plumbing Club.

Gentlemen,—

It is just a year since this Club was organized, and I know you will agree with me, when I say the benefits derived from this organization and the feeling of confidence and respect which it has been the means of creating amongst us has been beyond our expectations or hopes. A summary of our accomplishments just now would be quite in place and briefly are as follows:—

We have all acknowledged to be sinners to start with; we, therefore, had good subjects to work on and a large field to perform it in. We were satisfied that conditions were as bad as could possibly be, and could not continue without being driven out of business.

I have noticed the friendly feeling and goodwill which has grown among you; the carefulness with which you have gained each other's confidence; the frankness you have displayed in your suggestions and grievances. These mentioned characteristics are essential to a successful club and just as much so in your private business.

We have had a number of lessons on educational lines, in the way of determining overhead expense; the means of finding the cost of any particular article or class of goods; the price it should be sold at in order to return a fair profit; the way to estimate upon contract work, and the adoption of a system to eliminate the mistakes in overlooking or leaving out articles in taking off quantities; a better understanding as to pipe values with dealers not connected with the Club; more reasonable returns for the goods we sell and the services we render, and possibly you have noticed a more appreciable public since there is more equality in the plumbing trade; the sympathy of manufacturers and jobbers are beginning to have in our aims which eventually is bound to be co-beneficial to them; the revising of our city plumbing by-laws, which is likely to be more thoroughly and practically placed on record than we had hopes of. Those are the outstanding features of our accomplishments, as well as numerous others —small, but nevertheless as important ones which are noticeable almost daily.

However, with all we have accomplished, there is a lot of work yet to be done. We will not question the ability of our members as mechanics technically or practically, we will grant that we believe we are all that can be expected of us, but as business men, we fall short of our standard mechanically, and this is the important part of our business that requires greater attention. We have improved a lot in the last year and hope every member will aim to improve himself further. It is, I believe, most essential to our success in our trade. You may gain a lot of good information in your trade papers along these lines, and I would advise those of you who do not read your trade papers, to do so, as you are missing something. Personally, I have found them of great help.

I wish to take this opportunity of thanking you for the honour and support you have given me as President of your Club for the past year, and would respectfully ask you to accord the same support to my successor in office. By so doing, you will attain greater results, both collectively and personally, and remember we possibly and more probably have greater reason for good organization in the future than in the past, for the reason that in the re-adjustment period which is bound to come after this war, we will be confronted by slacker times, changes in market conditions, prices and possibly unorganized competition. My message to you is to be prepared to remain firm and be steadfast. We, no doubt, will have disappointments and jolts; do not let these relax your efforts, but grin and work harder and success will surely be yours.

Gentlemen, I have the honour to respectfully submit, as your President, the foregoing report.

Yours very truly,
Thos. J. Minnes.

Secretary-Treasurer's Report

To the members of the Plumbing Club.
Dear Sirs,—

As Secretary-Treasurer of your organization for the past year, I beg to submit my report, and, in doing so, wish to endorse most fully the sentiments expressed by our esteemed President.

The statement, of course, will speak for itself, but, as a business proposition, I feel much gratified with the results. I suppose this is because we all like to be handling enterprises that are successful.

Laying aside the details which are submitted to you separately, the summary of your year's finances is as follows:—

Receipts, $258; Expenditures, $133.51. Balance to our favour, $124.49.

In closing the books for the year, I wish to thank the members for their very active support and their promptness with which they have met the many calls made upon them, both of financial and of a business nature.

All of which is respectfully submitted.

Your truly,
Harry E. White,
Secretary-Treasurer.

NEW BOOKLET

"Kewanee on the Job," the title of a well-designed publication issued by the Kewanee Boiler Co., Kewanee, Ill., contains 40 pages of illustrations of buildings equipped with Kewanee boilers or other Kewanee equipment. This section is followed by a partial list of buildings heated with Kewanee smokeless boilers, arranged by States. The concluding section is devoted to "Kewanee—Its Products and Their Homes." Contrasting views are shown of the company's works in 1892 and in 1917. These are followed by detailed views, cut away to show the construction features of the Kewanee smokeless boilers, brickset and portable; the Kewanee boiler, brickset and portable; Kewanee radiators for steam or water; Kewanee garbage burners, Tabasco water heaters and Kewanee tanks. Size 8½ x 11 in. Pp. 80.

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RURAL SANITATION

IN A daily newspaper recently, there appeared an article which showed that rural districts, and villages were losing their population, in one case a certain district had lost 700 people in 25 years.

It was shown that in 1891 the five townships which constitute the east riding of Lambton had a population of 16,836 which decreased to 11,798 in 1916, a loss of over 5,000 in 25 years.

The fifteen townships in Huron county decreased from 50,460 in 1891, to 33,640 in 1916, a loss of 16,820 in 25 years.

This depopulation of the finest agricultural sections on this continent is sufficient cause for alarm—it is appalling, and must be checked in some way or other, before we find our farms isolated, or our small towns cease to exist.

We do not purpose enquiring into the reason for this big decrease in our rural population, but rather point out how best we sanitary engineers can do our bit towards stemming this tide, which cannot fail to have a serious effect upon our domestic life, not only rural, but also city life.

We of the craft know full well that of all occupations that of the farmer or rural dweller should be the most alluring. We also know full well that the work of the sanitary and heating engineer can be made to be more appreciated on a farm, than in a city home. The sanitary conveniences of a city home appear to be of such common interest, and matter of course, that the average city dweller does not appreciate our work and the comforts derived therefrom.

The point is why not plan right now, in order to bring pressure to bear upon our health departments in such a way as will require every rural home to be fitted up with sanitary appliances, that are really sanitary and not so in imagination only. Let us get our provincial boards of health to start a campaign of education along these lines and put into force some law that will enable a farmer to have his home built and fitted up with city conveniences, the cost of such necessities being spread over a number of years, just as is being done in many of our cities. There is no reason in the world why some such movement could not be started and the results would soon be self-evident. Why cannot the farmer keep his sons and daughters on the farm? Why cannot he have city comforts?

Simply because such appliances have been looked upon in the first place as luxuries, and as being too costly, first cost being too great a liability to be easily borne by the average farmer.

Now, we sanitary engineers can do much to eliminate both these troubles or apparent difficulties by urging that a federal department of health be formed, that Dominion-wide financial aid, as well as expert advice be placed at the disposal of every farmer in the Dominion. It is too big a problem for a province to grapple with unless every province is put on the same footing and enabled to put into practice such laws as will advise and aid every farmer in each province.

SERVE CANADA

THAT there is a serious shortage in supplies of almost every kind used by the sanitary and heating business cannot be denied.

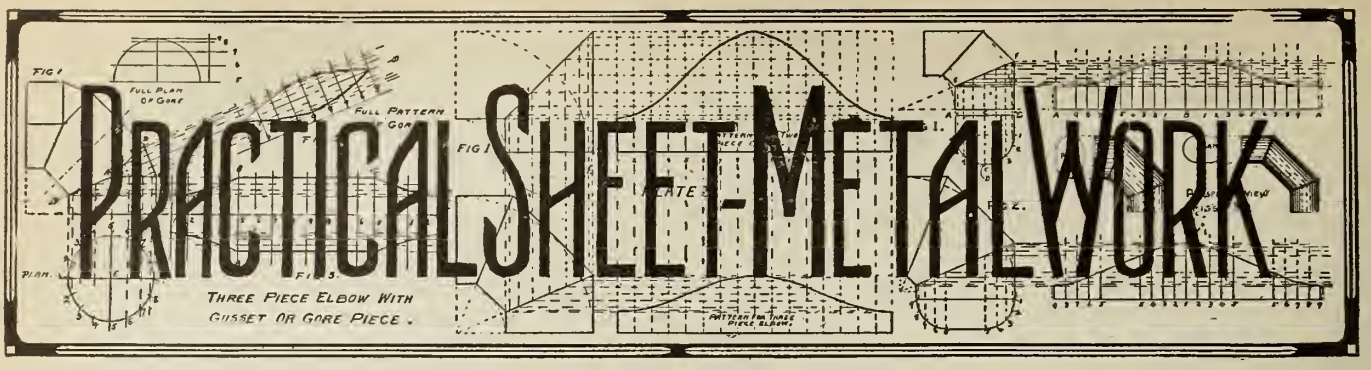
Material is costly, labor is short, railways will soon be taxed to the limit, during harvest, and a thousand and one things all contribute to this shortage, as well as make it a hardship to manufacturers in supplying many lines.

Now, how can things be remedied? Simply by the trade taking a look over their stock and finding out just what can be done to use up odd sizes and styles of goods, fittings, etc.

For instant, our association members could acquaint each other as to the kind of goods they have on hand that are not moving very freely. These goods could possibly be of use to one or another, barrels of cast iron fittings could be sorted out, and possibly bushings used so as to convert them into the sizes required. Cast iron fittings may be used in many places where malleable are not really necessary, though the latter, in normal times, would be advisable. Brass valves could be refitted, re-seated, etc., in an emergency.

Every step taken in this direction would be of great value all round. It would be a real step toward serving Canada, a true conservation scheme, which would not only work no harm, but would ease the situation in the long run.

As an example, some time ago SANITARY ENGINEER published an item which advised the trade to clean up the shop, pick up all scrap metal, brass, copper, etc., and we were informed by one of our readers that he picked up over $300 worth of scrap which he would not miss in his business.



BY THOMAS STANFIELD

THE next article for which pattern is to be developed is a little more complicated than any previous article described. It is that of a four-piece elbow with branch pipe taken therefrom.

Such a fitting can often be used to advantage in furnace work, particularly where a rather large pipe is required for a long run, and a small pipe is required for say a bathroom or small sewing room on a floor higher than the one for which the large pipe is needed.

First draw the elevation, Fig. 1, which is that of a four-piece elbow. From this elevation develop the two half plans of elbow and branch, shown at right hand. Next divide the half plan of branch into equal parts 1, 2, 3, 4, 5, 6, 7, and from these points draw four dotted lines intersecting the half plan of elbow. From these latter points, draw a number of lines parallel with I. G. E. C. intersecting lines CD, EF, GH, and IJ.

Next draw a full plan of the branch from the elevation, using a vertical line erected from E as centre, and draw another line at right angles to it as shown by 1, 7. Then divide this plan into twelve equal parts, beginning at point 1 on horizontal line until the whole plan is divided.

From these points draw a number of vertical dotted lines cutting the dotted lines previously drawn on the elbow. An additional line will also be required which must be drawn from a point on the mitre of elbow at A, upward until the plan is again intersected as shown at 3a, 3a.

To develop the pattern for the branch piece K.L. MN. draw first a stretchout line, in line with KL, as shown by line L^1 K^1, L^1. Next draw a number of dotted lines from each point of intersection between N, E, M, in Fig. 1 until line M^1 is completed. Then transfer the measurements shown in plan of branch as follows beginning at L^1, 1, 2, 3, 3a, 4, 5, 6, 7 and repeat.

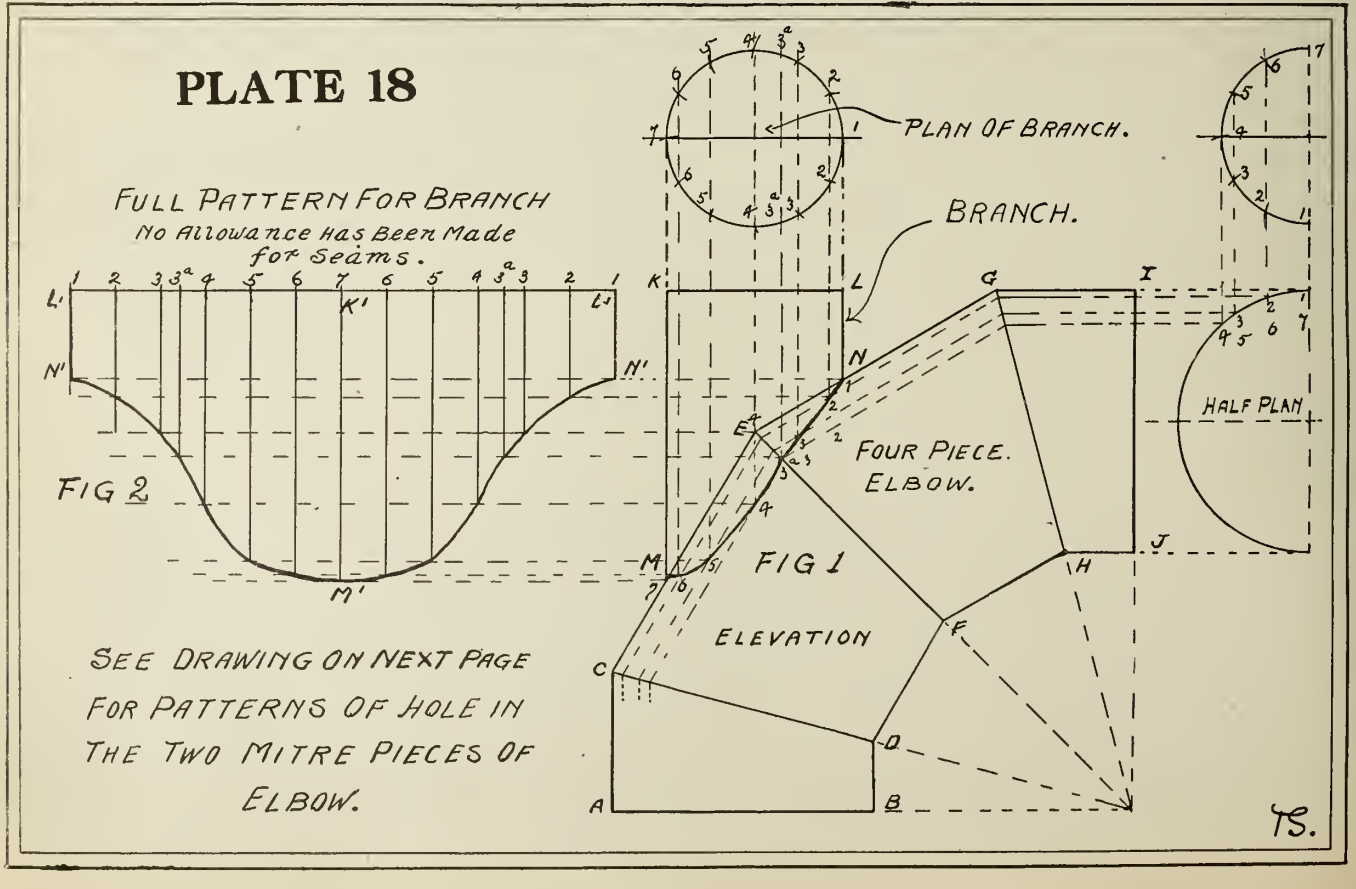
From these points draw a number of vertical lines until all the horizontal dotted lines are intersected. Now draw a solid line in form of a curve connecting each of these points until the solid outline L^1, K^1, L^1, N^1, M^1 N^1 is completed. this will be the pattern of branch piece Fig. 2. No allowance has been provided for seams.

Fig. 3 shows the patterns for hole in heel of the four-piece elbow.

First draw an elevation of the four-piece elbow, though only the two-piece centre pieces are really required. From this elevation draw a plan as well as plan for branch.

Divide the small plan as was done in Fig. 1, draw a number of dotted lines cutting the plan of elbow as shown 1, 2,

(Continued on page 22.)



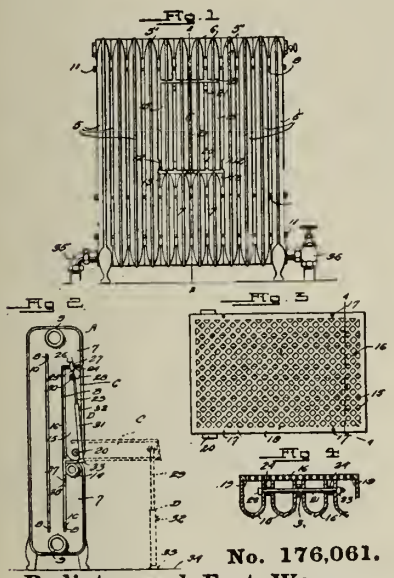
New Canadian Patents

No. 176,061.

Robert C. Givler and Margaret Givler, co-inventors, both of Seattle, Washington, U.S.A., 3rd April, 1917; 6 years. Filed 31st June, 1916. Receipt No. 266,948.

Claim.—1. A combined radiator and foot warmer comprising in combination a radiator formed to provide a recess open at a face thereof, and a support pivotally carried by said radiator and adapted to fit into said recess thereof or swing to project laterally of the radiator.

2. A combined radiator and foot warmer comprising in combination a radiator formed to provide a recess open at a face thereof, and a support pivotally carried by said radiator and adapted to fit into said recess thereof or swing to project therefrom.



No. 176,061.
Radiator and Foot Warmer.

3. A combined radiator and foot warmer comprising in combination a radiator including a plurality of columnar sections, a plurality of said sections intermediate the ends of the radiator provided with columns at one face of the radiator divided transversely to provide a recess, and a support pivotally carried by said radiator and adapted to fit into the said recess thereof or swing to project laterally of the radiator.

4. A combined radiator and foot warmer comprising in combination a radiator including a plurality of columnar sections, a plurality of said sections provided with columns at one face of the radiator divided transversely to provide a recess, and a support pivotally carried by said radiator and adapted to fit into the said recess thereof or swing to project laterally of the radiator.

5. A combined radiator and foot warmer comprising in combination, a radiator including a plurality of columnar sections positioned to provide a recess bounded by the columns, and a support pivotally carried by said radiator and adapted to fit into the said recess thereof or to swing to project laterally thereof.

6. As an article of manufacture, a radiator including a plurality of columns positioned to provide an enlarged recess bonded by said columns at tops, bottoms and sides, and of sufficient size to accommodate the feet of a person therein.

7. In a combined radiator and foot warmer, two columnar sections in spaced relation provided with bearings, a plurality of columnar sections intermediate said first-mentioned sections, said second-mentioned sections including columns divided transversely to provide a recess, a support including pivots received by the said bearings of said first-mentioned columnar sections and adapted to fit into said recess or project laterally thereof, and means for holding all of said columnar sections in conducting communication for the heating fluid.

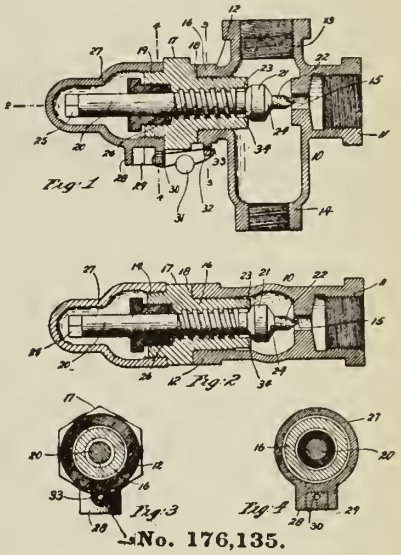
8. In a combined radiator and foot warmer, two columnar sections in spaced relation and provided with bearings, a plurality of columnar sections intermediate said first-mentioned sections, said second-mentioned sections, including columns divided transversely to provide a recess, the lower-most divisions of said second-mentioned columnar sections joined at tops and bottoms to conduct the heating fluid, a support including pivots received by said bearings of said first-mentioned columnar sections and adapted to fit into said recess or project laterally thereof, and means for holding all of said columnar sections in conducting communication for the heating fluid.

9. A combined radiator and foot warmer comprising in combination a radiator formed to provide a recess open at a face thereof, a support pivotally carried by said radiator and adapted to fit into the said recess thereof or swing to project laterally thereof, and an adjustable stay for said suport.

10. A combined radiator and foot warmer comprising in combination a radiator including a plurality of columnar sections, a plurality of said columnar sections provided with columns of one face of the radiator divided transversely to provide a recess, and a support pivotally carried by said radiator adapted to fit into said recess thereof to swing to project laterally thereof, said support including a plurality of elongated members adapted to align with the said divided columns when the support is in said recess.

11. A combined radiator and foot warmer comprising in combination a radiator including a plurality of columnar sections provided with columns at one face of the radiator divided transversely to provide a recess, and a support pivotally carried by said radiator adapted to fit into the said recess thereof, and swing to project laterally thereof, said support including a plurality of elongated members, U-shaped in cross section and arranged to align with the said divided columns when the support is in said recess, and a grating at the open longitudinal faces of said U-shaped members.

12. A combined radiator and foot warmer comprising in combination a radiator formed to provide a recess open at a face thereon, a support pivotally carried by said radiator and adapted to fit into the said recess of said radiator or project laterally thereof, a catch for detachably holding said support fitting into said recess, and a stay adapted to fit closely adjacent said support when not in use or to be swung outwardly releasing said catch and sustaining said support in a position projecting from said recess.



No. 176,135.
Fitting for High Pressures.

No. 176,135.

George W. Savage, Chester, Pennsylvania, U.S.A., 3rd April, 1917; 6 years. Filed 6th February, 1917. Receipt No. 275,370.

Claim.—1. A fitting of the class described embracing a casing having a relatively large inlet connection equipped with a valve seat having a contracted opening therethrough, a detachable valve stem bushing projected into said casing and disposed opposite the valve seat, an endwise movable valve stem carrying a valve piece operative through said bushing for closing the contracted opening, said valve piece being adapted to abut against the inner bushing end to maintain a normal working thoroughfare of determined maximum, a detachable shield operatively connected to form a point to prevent the escape of a medium under

pressure and which shield entirely incloses the valve stem end when the valve is in its full open position, and means acting as a seal connected between said casing and said shield.

2. A fitting of the class described embracing a casing having a relatively large inlet connection equipped with a valve seat having a contracted opening therethrough, said casing beyond and below said valve seat being provided with a combined expansion and deposit or drip chamber, a detachable valve stem projected into said casing and disposed opposite the valve seat, an endwise movable valve stem carrying a valve piece operative through said bushing for closing said contracted opening, said valve piece being adapted to abut against the inner bushing end to maintain a normal working thoroughfare of determined maximum, a detachable shield operatively connected to form a joint to prevent the escape of a medium under pressure, which shield entirely incloses the valve stem end when said valve is in its full open position, and means acting as a seal connected between said casing and said shield.

3. In a fitting of the class described, the combination of a casing provided with an inlet valve thoroughfare, a valve stem equipped with a valve piece for controlling the valve thoroughfare, said valve stem having a squared end, and a shield detachable with respect to casing and entirely enclosing the exposed end of the valve stem, said shield having formed in its wall a squared depression capable of engagement over the valve stem end when the shield is detached.

4. In a fitting of the class described, the combination of a casing provided with a relatively large inlet connection having a valve seat with a contracted opening therethrough, a valve stem equipped with a valve piece for closing said contracted opening, a detachable shield operatively connected with respect to the casing to form a joint for preventing the escape of a medium under pressure, which shield entirely incloses the valve stem end when the valve piece is in its full open position, and a wire seal connected between said casing and said shield.

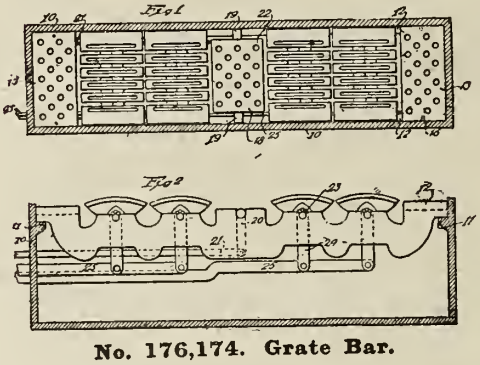
No. 176,174.

The Hansell Grate Company, Chicago, Illinois, assignee of Marcus E. Hansell, Anamosa, Iowa, both in the U.S.A., 3rd April, 1917; 6 years. Filed 18th August, 1916. Receipt No. 268,878.

Claim.—1. A grate comprising two substantially parallel side bars, each bar having a ledge at each of its ends extending towards the other side bar, and each ledge having a vertical perforation therein, perforated end plates resting on the ledges and connecting the side bars, vertical pins on the end plates smaller than and disposed in said perforations providing play in the connections between the side bars and end plates, a wide perforated plate pivotally mounted in and intermediate the ends of the side bars, grate bars pivotally mounted in the frame at each side of said central plate, manually operable means of controlling oscillations of the grate bars, and manually operable means independent of the first- mentioned means for controlling the movement of the central grate plate.

2. In combination, a grate frame, bars extending across and journalled in the grate frame, grate fingers, each having a notch in its lower edge engaging one of said bars, there being grooves in the grate fingers in the sides of said notches providing ventilating openings between the grate fingers and said bars, and deflecting plates in certain of the grooves of the grate fingers adapted to direct currents of air passing through said grooves toward said bars.

3. In combination, a grate frame, bars extending across and journalled in the grate frame, grate fingers each having a notch in its lower edge engaging one of said bars there being ventilating grooves between the sides of the notches and said



No. 176,174. Grate Bar.

bars extending substantially parallel with the latter, and vertical ventilating grooves in the sides of the notches opening into the first-mentioned ventilating grooves, and deflecting members in the first-mentioned grooves at the upper ends of the vertical grooves adapted to direct air toward said bars.

4. In combination, a grate frame provided with side rails, bars extending across and journalled in the side rails, grate fingers each having a notch in its lower edge engaging one of said bars, and projecting lips on certain of the grate fingers extending over and protecting the side rails from heat, there being recesses in the edges of said lips adapted to increase the radiating surfaces of the grate fingers.

5. In combination, two spaced side bars, ledges on the adjacent sides of the side bars at the ends thereof, there being a perforation in each ledge, and plates resting on said ledges and connecting the side bars, a projection on each end of each end plate smaller than and disposed in one of said perforations, and grate bars mounted in the side bars between the end plates.

6. In combination, a grate frame provided with side rails, bars extending across and journalled in the side rails, grate fingers each having a notch in its lower edge engaging one of said bars, and projecting lips on certain of the grate fingers extending over and protecting the side rails from heat, there being recesses in the edges of said lips adapted to increase the radiating surfaces of the grate fingers.

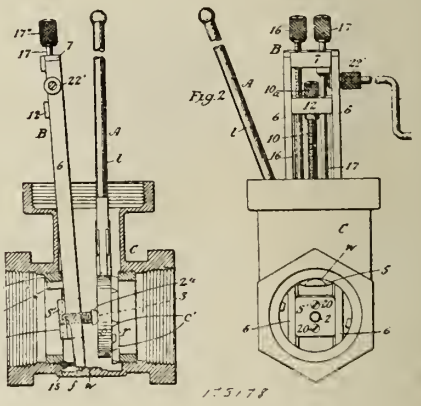
7. A grate comprising two side bars, wide perforated plates connecting the ends of the side bars, a wide perforated plate journalled in the intermediate parts of the side bars and spaced from the end plates, a plurality of oscillatory bars journalled in the side bars in the spaces between the wide plates, grate fingers on said oscillatory bars, and means for rocking the oscillatory bars independently of the wide plate journalled in the intermediate parts of said side bars.

No. 173,178.

The Leavitt Machine Company, Orange, Massachusetts, assignee of James Albert Stuard, Harrisburg, Pennsylvania, Frank Lorenzo, Smith, Chicago, Illinois, and Thomas Birch Williams, Orange, Massachusetts, all in the U.S.A., 14th November, 1916; 6 years. Filed 27th May, 1916, Receipt No. 266,054.

Claim.—1. A tool of the class described, comprising a cutter, an associated cutter bar having near the cutter a plurality of relatively movable parts for engaging the interior of a valve casing and holding the cutter bar to said casing, and means for effecting relative movement of said parts.

2. A tool of the class described, comprising a cutter, an associated cutter bar having near the cutter a plurality of



No. 173,178. Tool for Dressing Valve Seats, Etc.

relatively movable parts for engaging the interior of a valve casing and holding the cutter bar to said casing, and means for effecting relative movement of said parts and for maintaining the adjustment so obtained.

3. A tool of the class described, comprising a cutter, an associated cutter bar having near the cutter a plurality of relatively movable parts for engaging the interior of a valve casing and holding the cutter bar to said casing, and means carried by the cutter bar and operable from a point outside the valve casing for effecting relative movement of said parts.

4. A tool of the class described, comprising a cutter, an associated cutter bar having at different points in the length

(Continued on page 32.)

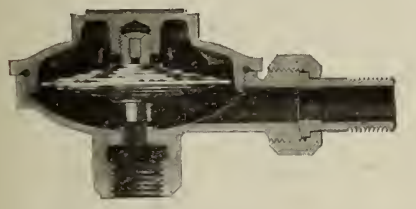
Development of Vacuum Steam Heating

It is Generally Conceded by Those Heating Engineers of a Few Years' Experience that Vacuum Steam Heating Has Been so Far Improved and Flexible That it is Not Only Used for Large Buildings, but Residences as Well, With a Great Deal of Success.

By A. J. Dickey, Toronto.

HEATING of this form is truly a twentieth century development. Like other of the engineering sciences, the development in heating has taken place under the pressure of necessity. Our present day sky-scraper would have no place in the affairs of men were it not for the development of the science of structural engineering that has provided the steel skeleton. The change in the character of our buildings due to the advent of steel, has brought with it development in every other line, and one of great importance to the owners and occupants of such buildings is the "Heating" system.

In the early days of steam heating and small office buildings, the radiators were formed by a continuation of steam pipes direct from the boiler and back again, without valves for regulating the amount of heat. The heat to be emitted to the room was regulated by covering or uncovering the hot steam pipes to meet the requirements. By degrees the one pipe steam system was evolved with its single pipe connection to conduct the



steam to the radiators, and the water condensation away by the same route. In one respect at least, the original system had an advantage over this one pipe system, in that over-heating was dispensed with through the partial covering of the radiators or steam coils; the one pipe system requiring to be turned "on" or "off" entirely. Both the early and later type systems were susceptible to troubles from air in radiators and knocking in pipes and requiring keen manipulation to get rid of either.

The next development was the two pipe steam system, with one pipe supplying steam to the radiator and another one carrying away the condensation. This system answered the requirements very well, at least satisfied the demand at that early time, until tall buildings became a necessity.

The death knell of the one and two pipe plain gravity systems was sounded with the erection of the first tall office building. It was apparent that some means besides the pressure of the steam must be provided to facilitate anything like an even distribution of steam through the radiator. As a result, a mechanical means of drawing on, or creating a "pull" on the returns from the system was provided. It proved a big improvement, but as new buildings increased in size, it became strongly apparent that some means must be provided to intercept the flow of steam from the radiators into the return piping system, and do it automatically, without obstructing the free exit of air and water condensation.

The extraordinary need for a satisfactory radiator trap for vacuum heating has brought many different types in different stages of perfection on to the market, but experience has pretty well established the superiority of the thermostatic type trap, because of its automatic operation over such a wide range of pressures within the heating system.

There are some architects that cling to the old type one or two pipe systems of heating, either because they secure exceptional results or they are not posted on the results to be gained from vaccum steam heating; we might add also, vapor heating.

Vacuum heating is the name applied to that form of steam heating which provides a system of steam piping for conducting steam at one-half to one pound pressure to the radiators, and a distinct system of return piping for carrying the air and water away from the radiators, with some mechanical means provided for the extraction of the air and water of condensation from the return piping system.

A vacuum pump, either steam driven or electrically driven, is the mechanical means provided for the extraction of the air and water and to create the pull on the return line system.

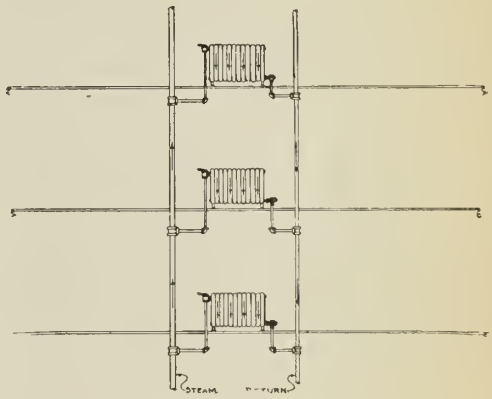
It is quite obvious that if all the points in the steam supply system that collect air and water were connected direct to the return piping system without some device to prohibit the passing of steam, then the steam will leak past steam main drip, and from radiators into the return piping system, and will expand in its gaseous form to dispel the "pull" of the vacuum pump, with the result that the mechanical means provided would do no useful work.

It is quite as obvious then, that if on the end of each and every radiator and every steam main drip a steam trap is imposed that automatically passes air and water condensation under varying pressure conditions, and at the same time prohibits the passage of steam, then under such conditions, the vacuum pump does do useful work by creating a "pull" on the returns of the heating system which extend to each and every steam trap and with the obvious result that there is a positive "differential" in pressure between the steam supply to a radiator and the return from it.

This means positive circulation with immediate response on opening of the control valve on the radiator.

In view of the importance attached to the functions of the steam traps in vacuum heating, it is fitting that mention be made of some of the features necessary, yes, even vital, to the successful vacuum system, and that should continue so year after year.

For illustration, the writer will refer to a radiator trap and compare it with what we might impose as an ideally perfect trap.



Major functions: 1st—Pass air; 2nd—pass water; 3rd—close for steam.

These major functions must be performed continuously and under varying conditions of steam pressures.

In addition, it must be a trap of a certain minor functions:

1. Simple of construction.
2. Free of loose or sliding parts to avoid sticking and thus interrupted operation.
3. It must not clog up.
4. It must not get out of order.
5. It must have long life.

The cut here illustrates a section of a radiator trap, and represents the interior arrangement with the heart of the trap, the corrugated hollow, diaphragm disc, permanently fastened into the cover, but suspended directly over the discharge opening of the trap.

This trap is known as the Hollow Disc Thermostatic type. The corrugated disc member is charged with a combination

of volatile fluids and the disc hermetically sealed under predetermined correct condition. The fluids thus sealed never can lose their power of expansion or contraction under varying temperature conditions.

The disc in each trap should be carefully adjusted to perform the three major functions—pass air, pass water, and close for steam. The volatile fluids used, together with the hollow corrugated disc construction, provide that these major functions are performed over the range of pressure from 15 inches vacuum up to 10 lbs. steam pressure

Dealing with the minor functions:

It is apparent that nothing could be more simple. Air and water has a direct passage from radiator to return pipe. Disc member is susceptible to temperature conditions in the radiator and responds to them.

It is free of any loose working parts; there are no sliding contacts to collect grease and dirt.

It is very unlikely to clog up because of the very large opening through the trap and the clearance between the valve and its seat.

Since the perfection of the vacuum trap, a newer and larger field has opened up in vacuum heating and vapor heating. Numerous vacuum systems operate on a vacuum condition in the radiators instead of steam pressure. All objections formerly caused by air-binding, water hammering, poor circulation, have been removed, and economies of startling figures have time and again been produced.

Any large or small industrial plant should have vacuum heating, it is the proven method in which heat can be circulated to each radiating unit, and, further, such a system lends itself to plant extensions readily.

Large buildings, groups of buildings and office buildings, where exhaust steam is available, should by all means have vacuum heating, with the other up-to-date devices for controlling temperature and humidity automatically.

The drawing shown here will serve to forcibly impress the value of traps on vapor heating systems in smaller office buildings, schools, hospitals, residences, etc., of the following is kept in mind.

The radiator connections should be made with supply at the top of hot water type radiators. The reason is plain when you consider that air is heavier than steam and will naturally settle to the bottom of radiator, permitting of an even, free circulation in the radiator.

As the lower radiators in the system fill entirely with steam, the trap closes and no steam, consequently no pressure is built up in the return piping system, and only a small pressure is necessary on the supply piping system to effect circulation, as each radiator trap on the system, in its turn, will close when the radiator it is connected to is full of steam.

This is simply the natural following of nature's laws and, after all, our tasks are always easier when we take advantage of nature's assistance instead of working against the laws.

The adherence to this principle in the case of the vacuum system in the Woolworth Building, New York City, the highest building in the world, was responsible for complete circulation through all radiators with about four ounces of pressure on the feed mains in sub-basement. This test was made before the vacuum pumps were started up.

It is obvious that there are great possibilities for vapor heating in buildings that do not require the vacuum system. The vital difference is the absence of a vacuum pump in a vapor system, in which case the air from the system is vented to atmosphere from the return system through open free vent, and water of condensation returns to the boilers by its own weight.

PRACTICAL SHEET METAL WORK

(Continued from page 18.)

3, 4. Then transfer the measurements 5 and 6 from small to large plane following 1, 2, 3, and 4.

Next draw a number of parallel lines from the large plan, cutting the mitre on elbow, these must be parallel with heel of elbow. Next draw two stretchout lines at right angle with heel of elbow near points G^a, C^a. Now turn to Fig. 1, place the compass at E, on mitre and open up to N, transfer this measurement to Fig. 3 as shown E^a and N^a and again to determine point M in Fig. 3. Then transfer the measurements from N, 1, 2, 3, 3^a, 4, 5, 6, 7 M on solid line Fig. 1 to the same position on dotted lines in Fig. 3. Now turn to the stretchout lines Fig. 3, and transfer the measurements described on large plan to each stretchout line as shown beginning at 6 to 1 and 1 to 6, and draw a number of parallel lines as shown. Next extend the stretchout lines cutting the dotted lines marked X.

Place the compass point at each X and open to 1, transferring measurement to point 1 on stretchout, then from X to 2, and so on until all the points between N^a and M^a have been used. By connecting these points of intersection. the two half patterns of hole in elbow are completed.

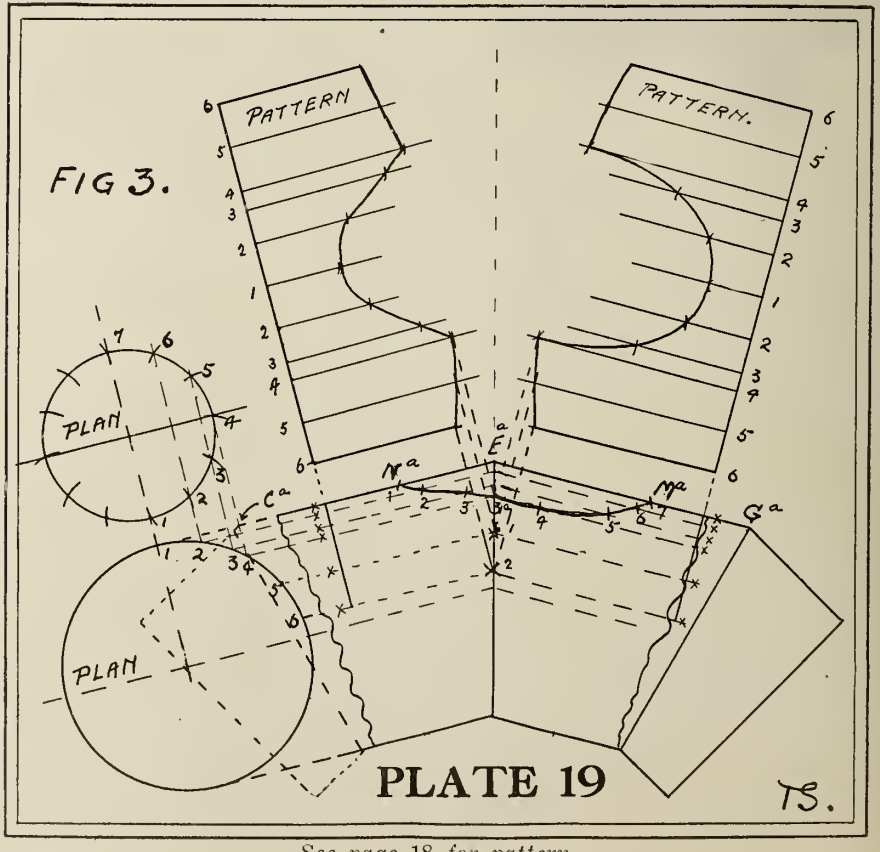
(Continued in next issue.)

His Week End.—A recruiting officer was busy in his temporary quarters recording on paper the answers given to him by stalwart young men from a neighboring village. There stood before him a brawny specimen of the agricultural class. "Denomination?" asked the officer. The laborer scratched his head. "Denomination?" the officer repeated. "What's your denomination?" The man felt in his pockets. "No, No! What I mean is—what persuasion are you—where do you go on Sundays?" "Fishisg!" replied the enlightened rustic.

A teacher in a North of England board school was recently examining a class of small boys in mental arithmetic. She said: "If your father gave your mother thirty shillings to-day, and two pounds to-morrow, what would she have?"

And a small boy, near the bottom of the class, replied:

"She would have a fit!"

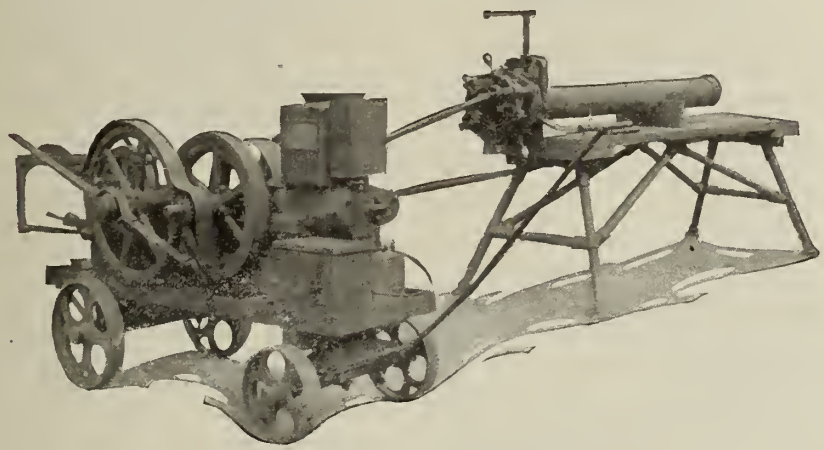


See page 18 for pattern.

New Sanitary and Heating Goods

PORTABLE PIPE THREADING MACHINE

At no period in the sanitary and heating trade has it been so necessary to conserve time as is the case these days. Sanitary and heating engineers find labor scarce, and work being kept back on that account. Taking these arguments for granted, more labor-saving devices are being bought and used. The above is a new device for cutting big sizes of pipe, as well as threading same. It is comprised of a rigid bench, gasoline engine with power saw attachment, along with a specially designed universal connection and gear case that can be attached to a pipe threading machine. The makers claim some very interesting qualities for the Columbus portable pipe machine.



Columbia Power Pipe Machine.

Full particulars and descriptive literature may be procured by writing the manufacturers, the Columbus Machine Works, Columbus, Indiana.

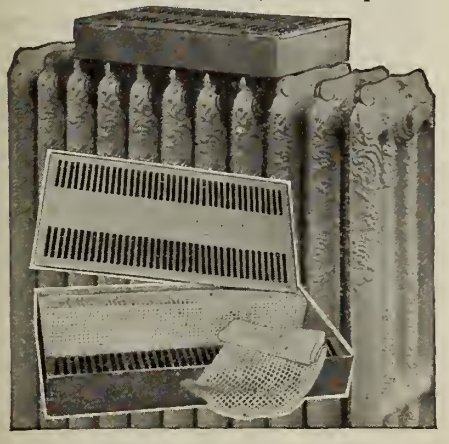
MOISTENS DRY HEAT

The Buddington Humidifier, shown herewith, is designed especially for the purpose of adding moisture to the dry, artificial heat in winter, and evaporates gallons of water, where it is said other devices evaporate pints.

The Buddington Humidifier is attached on top of the coils of either flat or round top radiators. It is described as neat and dignified in appearance, and looks like a part of the radiator.

It is designed along scientific lines. A water container runs through the centre. From this, wings extend on each side. These wings have a row of slotted holes throughout their length. Wicks, of specially woven material, dip down into the water, and rest over the slotted wings. These wicks act like a lamp wick, drawing the water up over the slots, through which the rising heat drives the moisture out into the air.

Complete details will be furnished by the Reid-Geisler Mfg. Co., 326 W. Madison St., Chicago, Illinois.



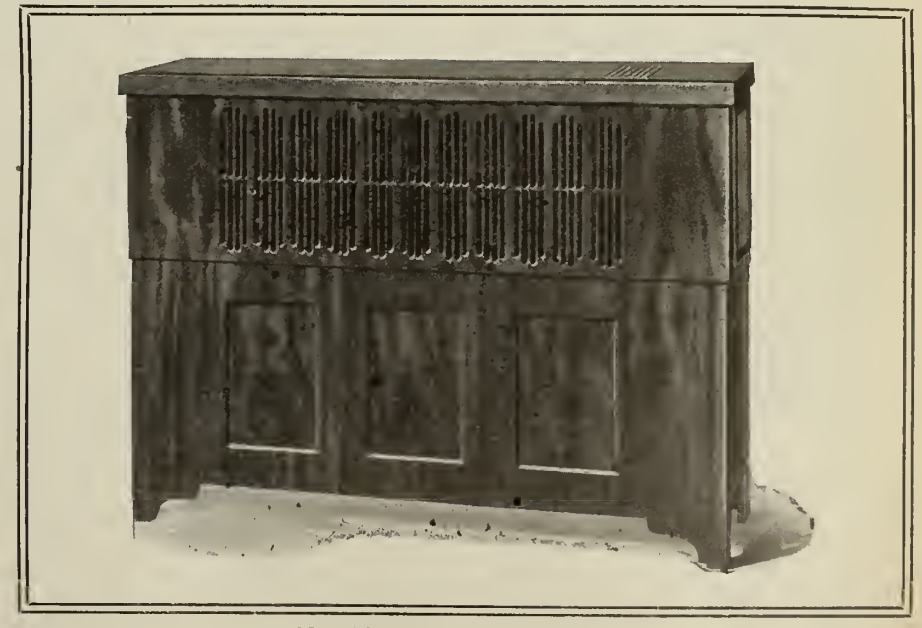
The Buddington Humidifier.

A NEW HEAT REGULATOR

A new heat regulator that controls the heat at the radiator is now being manufactured and put on the market. It is not a heating system, but an independent appliance of itself, specially designed to fit any type of radiator, either steam or hot water.

The Ja-Nar, as it is called, consists of two appliances in one. A steel cabinet fitted with louvres that open and close; second, a device operated with a syphon regulator, which responds instantly to the slightest change in temperature of the air circulating over and round it. The manufacturers claim that the temperature in a room can be automatically controlled and kept practically constant. Any temperature between 60 deg. and 80 deg. Fah. can be obtained by simply setting the regulator dial at the proper point.

Further particulars may be procured by writing to the Fulton Company, Knoxville, Tennessee, U.S.A.



New Na-Jar Heat Regulator.

IN preparing graphite for pencil-making, it is ground very fine, mixed with water, and passed through tanks to allow the heavier particles to fall, the finer particles passing onto five or six successive tanks, when, the necessary degree of fineness having been obtained, it is mixed with suitable clay which has been washed in the same manner. The mixture is submitted to further grinding, squeezed in bags to remove superfluous water, and forced through tubes to produce strips of the required shape and sizes, which when dried and baked, are ready for casing in wood.

Steam Traps, and How They Operate

Heating Engineers Will be Interested in This Series of Articles Which, After Describing Some of the Most Effective Radiator Traps, and the Tilt Trap, Will Deal With the Condensation Return Trap, Etc.

STEAM TRAPS—II.

THE constantly increasing use of low pressure and vacuum steam heating systems has resulted in the development of many types of devices for controlling the discharge of air and water of condensation from the radiators or other heating surfaces without permitting the loss of steam. For traps employed on this work the thermostatic principle is very suitable on account of the compactness of design obtainable through its employment.

Webster Water-Seal Valve

A successful adaptation of the float type of trap is found in the Webster Water-Seal Motor, which is one of many similar appliances used in connection with the Webster Vacuum and Modulation Systems. It is connected to the return line of each unit of radiation and at such drip-points as are necessary A sectional view of the interior of this valve is shown in Fig. 5, from which it will be seen that a cylindrical float having a tube through its centre is guided by a depending stem or guide-rod, which has a screw threaded surface.

The lower end of the tube performs the functions of a valve disc, and rests upon a specially constructed seat made to be removed from the body for the

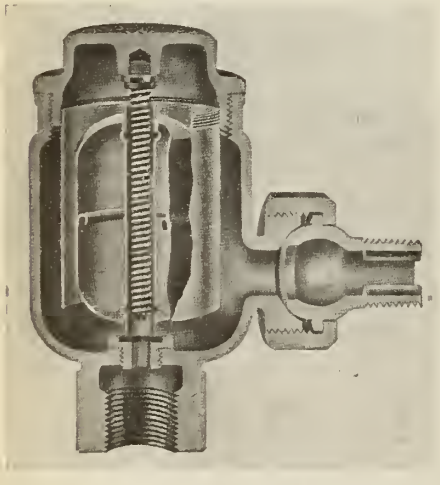


FIG. 5. WEBSTER WATER-SEAL MOTOR FOR DRAINING HEATING SYSTEMS.

purpose of allowing the entire heating system to be blown out thoroughly when installed, the seat being replaced after this is done. The tube and seat are accurately made and fit closely, eliminating any possible leak of steam at this point.

The above-mentioned depending stem

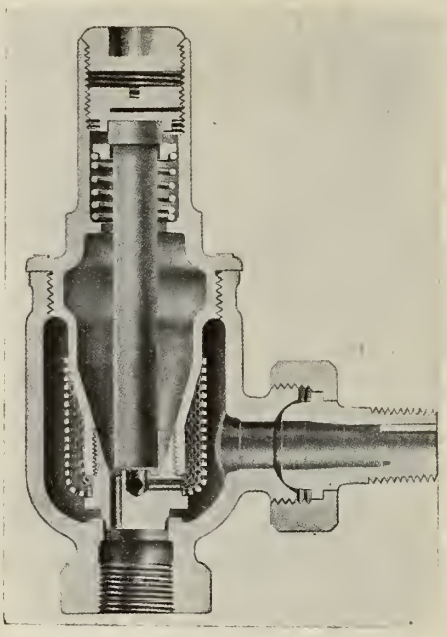


FIG. 6. SECTIONAL VIEW OF WEBSTER THERMOSTATIC VALVE.

is primarily intended to act as a guide on which the float will operate freely, yet it is sufficiently close-fitting to prevent the direct escape of steam or vapor although permitting these bodies to pass in a downward direction through the spiral passage formed between the screw-threaded stem and the inside of the tube. In action, the float is given a slight rotative motion, which relieves the device of the fine sand or oxide of iron which is inherent in any heating system. The top of the screw thread forms a reduced bearing which does not catch and hold dirt, while the friction is at a minimum.

No manipulation is required in the operation of this water-seal valve which is entirely self-adjusting. On the entrance of steam into a cold radiator, the air is displaced and expelled, passing from the radiator into the inlet passage, upward through the annular passage between the float and the surrounding sleeve, to the top of the bonnet or cap, from which point it passes downward through the thread spaces between the guide-rod and the inside of the tube, to the discharge opening, and thence into the returns. This exhaustion is completed almost instantly.

Meanwhile, the steam which has entered the radiator expands rapidly, and condenses in giving off its heat by radiation. The water so formed flows into the valve body and rises until it is elevated to such a point as to form a water-seal between the sleeve and the float, and commences to buoy the latter.

The lifting of the float raises the tubular valve piece off its seat, and the solid body of water is discharged through the opening of the seat into the return line. The float remains raised until the buoying water has escaped, when it drops to its original position, thus seating the tube on the valve seat.

This action continues intermittently according to the varying quantities of condensation, the air and water being thoroughly ejected, although the steam vapors are not allowed to escape.

In Figs. 6 and 7 are shown two Webster devices for heating systems, operated thermostatically. The principal feature of the former is the expansion valve member which is adjustable from the top by removing a plug. The valve seat is carried in the lower end of the cap, which is in the form of a chamber, the valve seat being so constructed that

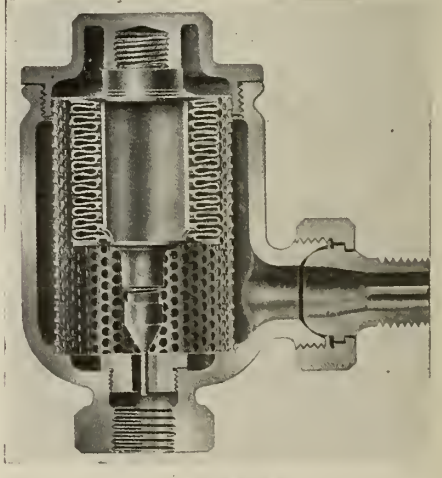


FIG. 7. SECTIONAL VIEW OF WEBSTER SYLPHON THERMOTOR.

the water and steam vapors enter the chambers upwards through the central hole and surround the expanding member, which expands as the temperature

rises until it closes against the seat. The vertical hole right through the seat maintains the chamber in direct communication with the returns, so that the temperature of the expansion member does not rise any higher than is necessary to close the valve.

A corrugated cylinder containing an expansible liquid is the operating element of the trap shown in Fig. 7. The corrugations are of such a shape and sufficient number that considerable changes in length may take place without stressing any portions of the cylinder unduly. The cylinder is hermetically sealed after being filled with the liquid which can only expand lengthwise, so that slight changes in its temperature cause relatively large movement of the valve on the lower end of the cylinder. Means of adjustment are provided so that the valve will pass water and air freely, but will seat tightly when the hot steam vapors come in contact with the cylinder.

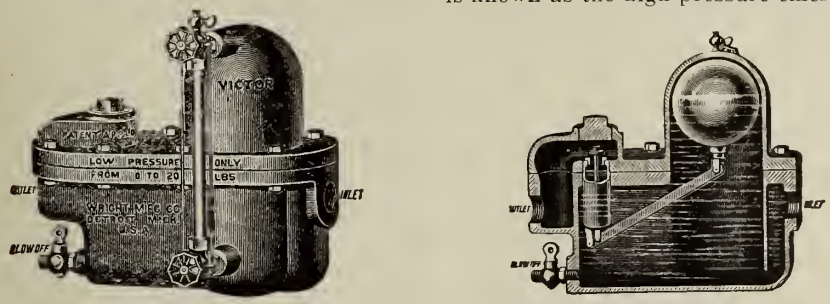


FIG. 8. WRIGHT VICTOR TRAP FOR PRESSURES UP TO 20 LBS. PER SQ. IN.

Wright Steam Traps

In addition to manufacturing the various devices used in connection with Webster heating systems, Darling Bros., Montreal, also make the Wright steam traps in two types, suitable for low and high pressures.

Two views of the low pressure type are shown in Fig. 8. This trap is of the float type, and is suitable for steam pressures up to 20 lbs. per sq. in., although it is also capable of operating when there is no pressure whatever, as the parts are so proportioned that the incoming condensation alone is sufficient to lift the valve. The body of the trap is so proportioned as to provide a deep water seal, covering both inlet and outlet, which prevents the direct passage of steam through the trap. This seal is maintained steadily, as discharge does not take place until the water reaches the level of the valve.

High Pressure Type

The other type of Wright steam trap is known as the high pressure emergency and will operate on pressures up to 200 lbs. per sq. in. (see Fig. 9). Three steam-tight outlet valves are employed in place of one, and are located at the highest point of the trap, where they are entirely removed from grit, scale and sediment. Blow-off taps for removing deposit are provided in both types of these traps.

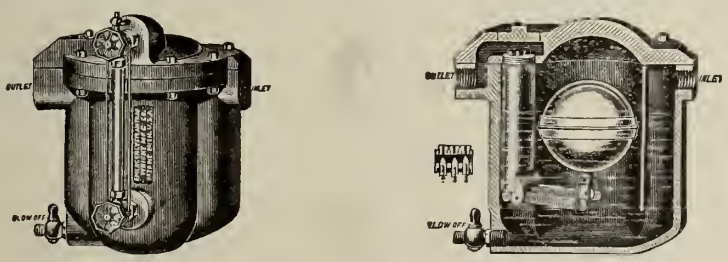


FIG. 9. WRIGHT HIGH PRESSURE EMERGENCY TRAP WITH TRIPLE DISCHARGE VALVE.

Davis Float Trap

An interesting type of trap for general service is the Davis, made by the G. M. Davis Regulator Co., Chicago, possessing several features of interest to trap users. This apparatus is of the float type with balanced valves continually submerged during working. The phantom view in Fig. 10 shows the arrangement of interior mechanism, which is entirely attached to the cover and removable with it. Entrance of condensation through the inlet above the float first floods the valves and creates a permanent water seal for the outlet. As the water level rises the float is lifted, opening the valves and permitting the escape of water to the outlet. The valves remain open to continuous flow so long as the condensation continues to enter and the float is held up; when the flow stops and the level falls, the float descends, closing the valves which are water sealed to a depth of from two to four inches.

The form of the valves is such that for slight flow of condensation they provide a correspondingly small opening; while for higher rates of flow they automatically provide a passage of increasing area as the float rises to its extreme height, thus providing a self-regulating discharge of continuous flow for any rate of influx up to the limit of capacity.

Balanced Valves

The use of two valves, each of ample proportion, provides full capacity for the size of pipe connections provided. One of these valves opens upward and the other downward, giving perfect balance with and against the inlet pressure, the result being that the trap is not only sensitive in action, but is also suitable for either high or low pressure work, from 1 to 200 lbs. pressure. Both valves and seats are of Tobin bronze, the valve casing is of high-grade steam metal, and the trap body is of cylindrical form, well adapted to withstand high pressure.

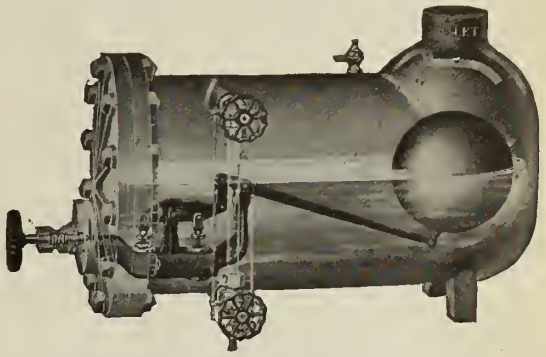


FIG. 10. PHANTOM VIEW OF DAVIS TRAP SHOWING BALANCED VALVES AND MECHANISM ATTACHED TO COVER.

When the cover is removed, all of the working parts come with it, and are thus removed intact for inspection, adjustment, or repair, without disturbing the pipe connections in any way. A self-contained by-pass is provided in the cover, by opening which the interior of the trap body may be drained before removing the cover. The discharge outlet is situated on the opposite side of the trap body from the gauge glass. The trap is made in eight sizes, from ½-inch to 3 inch connections with capacities from 1,500 to 60,000 lineal feet of 1-in. pipe.

"Progress is Waterworks Pumps," is the title of a catalogue issued by the De Laval Steam Turbine Co., Trenton, N.S., and compiled from the company's records. The catalogue contains a great deal of interesting information relative to development and advantages of steam turbine driven centrifugal pumps.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

AN embargo placed on the shipment of pig iron from the United States has had the effect of throwing Canadian manufacturers entirely on domestic source of supply. Manufacturers of enamelware, who have been in the habit of bringing this commodity from the republic are in a quandary to know where they will be able to get supplies. The outlook is not encouraging. Even in the face of this condition a decline was registered in the price of cast iron basins of approximately twelve and one-half per cent. This has been occasioned more by reason of lowering of manufacturing cost than through a reduction in price of raw materials. Lines in which advances have been recorded include cast iron pipe fittings, cast elbows, tees, plugs, bushings, unions. One dealer has also advanced the price on globe, angle and check valves by the changing of the discount. Galvanized sheets have been lowered in price in some quarters. Old materials show a weaker tendency with declines registered in old brass and copper. Ingot metals are in a number of instances in weaker position. Business in plumbing lines is somewhat light but demand on valves continues exceptionally good.

TORONTO, August 31.—A number of changes have been recorded during the time since last issue, the majority of which have been in an upward direction. Declines however were recorded in cast iron lavatories, drinking fountains and bubblers. Building activity is not brisk at present and manufacturers of plumbers' supplies do not anticipate an immediate resumption of operations. As pointed out in these columns heretofore there is a class of builder in the market who has had no historic background of low prices an consequently the present comparatively high prices do not keep him from building if he has the desire. If he wants to build and can see the opportunity of disposing of his buildings he does not hesitate to pay the high prices for materials. There has been a fairly good business in the time intervening since last issue taken all in all.

Prompt Return of Coal Cars Causes Shortage

WROUGHT PIPE.—The regulation of the United States Government calling for the immediate return of coal cars to the United States after their load has been delivered has operated to cause a further shortage of available space for Canadian manufacturers. Manufacturers of wrought pipe are finding their operations restricted still more on this account. Formerly they could use these cars for return shipments as far as the American border but they are not allowed to detain the cars even long enough to load them up. The United States Government is making an endeavor to see that sufficient supplies of coal are distributed into Canada, but they will not allow the cars to be used for any other purpose. The licensing system on iron and steel of shipments from the United States is adding other difficulties to the manufacturers' prospect. Canadian manufacturers are taking the situation with good grace and are endeavoring to make the best of it. There is not much new work being undertaken to cause an active demand. Prices are holding firm according to the list of July 5.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917

	Standard Buttweld Black	Galvanized
	Per 100 feet	
⅛ in.	$ 5 00	$6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
	Standard Lapweld	
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES

4" and under, 45%

4" and under, running thread, 25%.

4½" and larger, 40%.

STANDARD COUPLINGS

4" and under, 35%.

4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces

Basins and Drinking Fountains Have Declined

ENAMELWARE.—A welcome change in price movements has taken place in two lines of cast iron enamelware, basins and drinking fountains having recorded lower prices. In the case of basins the decrease amounts to 12½ per cent. One of the popular selling lines P4205 that formerly sold for $11.50 is now quoted at $10. In all four designs of lavatories are affected by the change. Drinking fountains and bubblers have also been reduced in price. Bathtubs, sinks and closets remain unchanged. Demand on the various lines of enamelware is somewhat slow.

Bath-tubs, roll rim, 4, 4*, 5 feet, 24 to 30 in. wide	$32 10
Bathtubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple	16.80
Closets, oak tank and seat	22.00
Do., enamel iron or white vitro tank	23.75

Cast Iron Fittings, Plugs and Bushings Up

SOIL PIPE FITTINGS.—An increase in the price of cast iron fittings, cast elbows, tees, plugs, bushings, flange unions and dart unions. Cast iron fittings, elbows, tees, etc., are now quoted from 15 per cent. to 10 per cent. off list as compared with the former discounts of 15 to 18 per cent. Plugs have been advanced and are now quoted at 30 per cent. off list. Bushings are quoted from 33 per cent. to 20 per cent., while standard flange unions are quoted at 20 per cent. off list. Dart unions from ¼-inch to 2-inch are quoted from 25 per cent. to 20 per cent. off list.

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe		30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	10%	15%
Cast elbows, tees, etc.	10%	15%
Plugs		30%
Bushings	20%	33%
Flange unions, standard		20%
Dart unions, ¼-inch to 2-inch	20%	25%
Nipples, up to 4-inch		45%
Do., 4½-inch and larger		40%
Do., running thread 4-in. and under		25%

Couplings, 4 in. and under		35%
Do., 4½ in. and larger		15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.	0 50	0 63
Do., Class B, lb. net	0 22	0 33
Do., Class C, lb. net	0 15	0 22

Globe, Angle and Check Valves Advance

VALVES.—Globe, angle and check valves is one of the important lines to register an advance during the week, the discount on standard line being changed from 15 per cent. off list to 10 per cent. off list. High grade remains unchanged at 7½ per cent. off list. There is an excellent demand for valves, particularly on steam work. Other lines remained unchanged during the time since last issue.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Oakum Held in Steady Position

OAKUM.—The market for oakum remained unchanged during the time since last issue so far as price changes are concerned. There is still a range in the market on plumbers' spun oakum, varying from $8.50 to $9.50 per hundred pounds in bale lots. Demand is not heavy on this class of oakum but on lines used in shipbuilding there has been a fairly good demand due to building of ships.

		Per 100 lbs.
Best American		$21.00
U.S. Navy (American)		20.00
Plumbers' Spun	8 50	12.00

Shipbuilding Taking Plates in Abundance

RANGE BOILERS.—With the great activity in shipbuilding going on at present on this continent plates that in ordinary times could be diverted to other lines of manufactured products have been going into the manufacture of ships, thus causing a shortage for lines of domestic manufacture such as range boilers. There is a fair demand for this line. Prices have held steady during the week in view of the restriction on supplies of raw materials.

30-gallon range boilers, standard	$13.00
35-gallon standard	14 50
40-gallon standard	15.50
52-gallon standard	28.00
30-gallon extra heavy	17.00

Galvanized Sheets Down 75c With One Dealer

SHEETS, PLATES.—A decline of 75c per 100 pounds was recorded in the price of galvanized sheets during the week, which now makes the price of 10¾ oz. $11.25 per 100 pounds. The majority of concerns were still quoting at $12. The decline was due in large measure to the new ruling of the Dominion Government effective July 4, which provides that duty shall be paid on the basis of home consumption price at time of purchase plus 25 per cent. of increase in price at the time of delivery if any increase has been effected. Prior to that time the ruling was to the effect that duty must be paid on the basis of price of home consumption at date of shipment. The new ruling means that duty will not be charged greater than 25 per cent. of increase of value of purchase price. This ruling applies to stocks that have been on order for no greater length of time than nine months. After that length of time they must pay on the full amount of increase. Some dealers report a better accumulation of stocks. Prices on black sheets in the United States were weaker with some mills, but locally there was no change in wholesalers' prices .

TORONTO—		
BLACK SHEETS—	Per 100 lbs.	
10 gauge	$.....	$11 50
12 gauge	10 05	11 60
14 gauge	9 95	11 65
16 gauge	10 00	11 75
18-20 gauge	9 80	10 80
22-24 gaug	9 85	10 85
26 gauge	9 90	10 90
28 gauge	10 00	11 00
29 gauge	10 10	.....
3-16 inch plate	.....	12 25
¼-inch boiler plate	.....	12 00
GALVANIZED SHEETS—	Per 100 lbs.	
10¾ oz.	11 25	12 00
U.S. 28	10 95	11 70
U.S. 26	10 65	11 40
22 and 24	10 50	11 25
18 and 20	10 35	11 10
16	10 20	10 95
14	10 10	10 85

Corrugated Sheets Still in Waiting Market

CORRUGATED SHEETS, EAVETROUGH.—There was a disposition to wait developments in the American market before taking any action with respect to prices on these commodities by local dealers. Dealers assert that an advance has been warranted for some weeks past but the disposition has been to go slow in any price changes until conditions in the American market are cleared up. Demand has not been heavy for this class of goods and there has been but little incentive to make dealers in a hurry about changing their quotations. Eavetrough and conductor pipe remain unchanged at the discount of 10 per cent. off list.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7 20
No. 26 gauge	9.60-10.00	....

Boiler Tubes Are In Fair Demand

BOILER TUBES.—Dealers report a fairly good demand for boiler tubes, with the expectation that the demand will be much better during the month of September. Overhauling of boilers usually becomes more general at that time in preparation for the winter. Prices are holding steady with no intimation made that there is likely to be any alteration in the near future.

1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
4-inch	82 00	67 00
3½-inch	70 00	55 00

Solder Again Inclines to Lower Price Levels

LEAD AND ZINC PRODUCTS.—A decline of 1c per pound was registered on the price of guaranteed solder during the week, making the quotation 40c per pound. Strictly half-and-half was weaker by ½c and is quoted at 37½c per pound. Wiping solder has declined ⅛c also and is now quoted at 37½c. The weaker position in tin in the primary markets for some time past has been responsible in a measure for the decline. Lead has been quiet with a light demand in the primary markets. Prices on other lead and zinc products remained unchanged.

Lead pipe, lb.	$ 0 19	....
Lead waste pipe, lb.	0 20	....
Lead traps and bends	20% on list	
Lead, wool, lb.	0 17	....
Lead, caulking, lb.	....	0 14¾
Lead sheets, 3 lbs. sq. ft.	0 17¾	....
Lead sheets, 3½ lbs. sq. ft.	0 17¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 17½	....
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 40	....
Solder, strictly, lb.	0 37½	....
Solder, commercial, lb.	0 36	....
Solder, wiping, lb.	0 37½	....
Solder, wire, lb.	0 41	0 45
Zinc sheets, per lb.	0 26	....

Old Brass, Copper and Lead Pipe Down

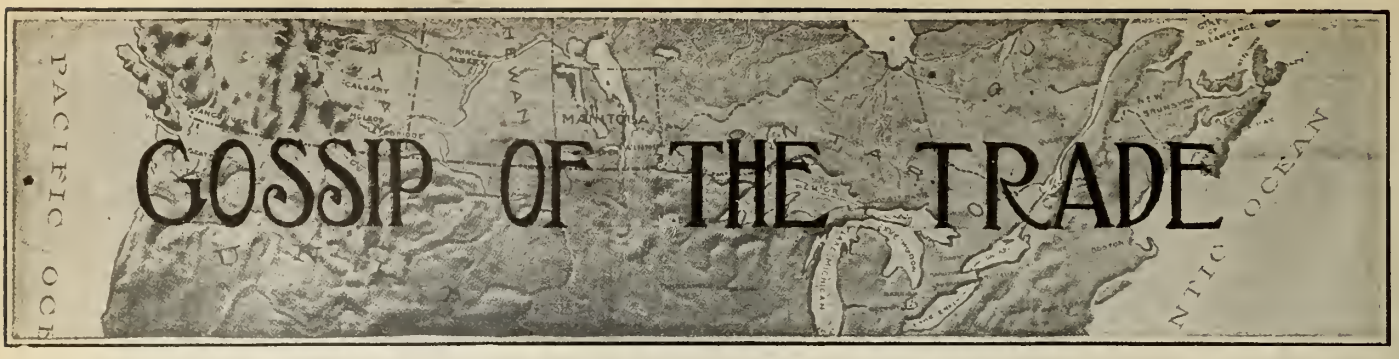
OLD MATERIALS.—There was a weaker tendency in old materials during the week tea lead having declined ¾c per pound, heavy lead pipe 1c to 1¼c, red brass 1c and heavy copper 2c per pound. The lower prices were induced through the feeling that the United States Government is likely to fix a price on copper that will be in the vicinity of 20c per pound. Consumers are accordingly holding away from buying in the expectation that there will be a break in the market. Collectors of old materials have not shown any disposition to dump their stocks.

Tea lead	$ 0.07½	.....
Heavy lead pipe	0.09¼	.....
Yellow brass	0.14¾	0.15
Red brass	0.20	.....
Light brass	0.09½	0.10
Heavy zinc	0.06½	0.07
Heavy copper	0.22	.....
Stove plate, per ton	17.00	18.00

Ingot Metals Show Weaker Tendency

INGOT METALS.—There was a generally weaker condition in ingot metals

(Conditions on page 29.)



MIMICO SEWAGE PLANT

Mimico's new sewage pumping station was recently put in operation. The structure cost $26,000 and is designed to serve both Mimico and New Toronto.

NEW TORONTO INCINERATOR

The new incinerator being constructed at New Toronto at a cost of $10,000 will soon be ready for operation. In conjunction with the incinerator a system of garbage collections will be instituted by the Town Council.

INCORPORATIONS

Montreal Machine Shop, Ltd., has been incorporated at Montreal, Que., with a capital of $100,000 to deal in metals and manufacture machinery, motors and steam and hot water heaters.

TRADE NOTES

J. O. Desmaris & Co., plumbers, Montreal, Que., have dissolved.

Sydney Posner & George Posner have been registered as Posner Bros., plumbers, etc., at Montreal, Que.

W. J. Domelle, plumber, Toronto, Ont., has been succeeded by Domelle & Pamenter.

J. E. Sanderson, plumber, Orangeville, Ont., has leased more spacious store premises for business.

John McKelvey of McKelvey & Birch, plumbers, etc., Kingston, Ont., has retired after being in business for the past fifty-five years here. He is also one of Kingston's ex-mayors.

PERSONAL

Mr. F. F. Longley, who formerly had charge of construction of the slow sand filtration plant at Toronto, Ont., has been granted a commission as major in the U. S. army, and has been sent to France to assume entire charge of water supply for the American expeditionary force. Mr. Longley is a member of the firm of Hazen & Whipple, consulting engineers, New York City.

CONTRACTS AWARDED

Windsor, Ont.—Plumbing and heating contract in connection with the erection of $140,000 factory for Maxwell Motor Co., Detroit, Mich., has been secured by Windsor Hardware Co.

Toronto, Ont.—A. Welch & Son, 304 Queen W., have the plumbing and heating contracts for $15,000 warehouse for S. & L. S. Yolles, 67 Baldwin St.

Perth, Ont.—J. T. Blyth, Frank St., Ottawa, has the heating and plumbing contracts for alterations costing $30,000 to school for the Public School Board.

McLaughlin Bros., 574 Somerset St., Ottawa, have the general contract for 36-inch. to 60-inch sewers for the Works Department, City Council, St. Catharines, Ont.

Currie & Murnaghan, 82 Queen St., Charlottetown, P.E.I., have the plumbing and heating contracts for $28,000 boys' academy for the Roman Catholic Congregation, Magdalen Islands, Que.

New Waterford, N.S.—D. H. McLean Co. have the general contract for 653 feet of sewerage, 3,100 feet of curbing and 1,195 square yards of concrete sidewalk costing $40,000 for the Town Council.

Smith's Falls, Ont.—James Macdonald, 20 Mary Street, has the general contract for sewer and water-main on Smith's Falls Ave., costing $7,800, for the Town Council.

London, Ont.—The tender of Noble & Rich has been accepted by the Public Utilities Commission for installing a hot water heating system in the Utilities Building. The contract price is $5,490.

Pointe Claire, Que.—The Town Council have awarded a contract for water filtration plant and lift pumps to Arsenault & Plamondon, Montreal. The contract price was $38,500.

Cobourg, Ont.—M. D. Gibson, Albert Street, has the general contract and will purchase 600 feet of 6-inch tile for sewer from Ontario St. to Factory Creek for the Town Council.

A. McDonald and P. Nicholson, Toronto, Ont., have been allotted the contract for construction of a sewer on Yonge Street from Rosedale Creek sewer north to Lawton Avenue, and thence to Gormley Avenue at a cost of $105,000.

Campbellford, Ont.—Mr. McManus has the general contract, and Geo. A. Brenton, 99 Hunter St., Peterboro, the plumbing contract for sewer and plumbing work for Primary, Public and High Schools for the Board of Education.

CATALOGUES

Steam Specialties.—The V. D. Anderson Co., Cleveland, Ohio, have issued a new and well gotten up catalogue entitled "Anderson Steam Specialties," which include steam and air traps, steam and oil separators, water columns, pressure oil filters, copper flats, etc. The construction and operation of each product is fully described, accompanied by illustrations showing exterior and cross sectional views. Tables are also included giving the principal dimensions and other data for each size of traps or separator, etc. The catalogue also contains plates showing three arrangements of the Anderson oiling system.

SERVE OTHERS

Doing nothing for others is the undoing of one's self. We must be purposely kind and generous, or we miss the best part of existence. The heart that goes out of itself gets large and full of joy. This is the great secret of the inner life. We do ourselves the most good doing something for others.—Horace Mann.

JOINT SEWAGE SYSTEM FOR MIMICO AND NEW TORONTO IN OPERATION

The Joint Sewerage System for Mimico and New Toronto has just been put in operation. This includes a sewage pumping station in Mimico at the corner of Superior avenue and the Lake Shore road, and a sewage disposal works situated north of the G. T. R. tracks on Grand avenue, representing an outlay of $26,500. By means of a 36-inch trunk sewer, three miles in length, along the Lake Shore road, New Toronto is connected with the pump and disposal works in Mimico. Over eight miles of sewerage have been laid in both towns and connections will be made on the local improvement basis. The pumping station, which cost $6,500, is a fireproof structure, built of pressed brick. The pumping machinery consists of two electrically-driven centrifugal pumps, with capacities of 500 and 1,000 gallons per minute, respectively, also one gasoline-operated pump with a capacity of 750 gallons, which will be used as an auxiliary unit. Beneath the floor of the station is the well from which the sewage is pumped. It is divided into three compartments, each with an approximate capacity of 2,500 gallons. To connect this building with the disposal works, about one mile distant, a force main 16 inches in diameter was laid. The disposal plant cost $20,000 to construct and consists of four buildings containing sedimentation tanks, sprinkling filters,

chlorine disinfecting and humous tanks, It is designed for a capacity of 3,000 connections. All of the buildings are of solid concrete, with either wood or steel roofs, with the exception of the disinfecting plant, which is of brick and concrete. Mr. F. F. Fry of Toronto, carried out the building contract, and the Toronto Equipment Company installed the machinery. Pipe was supplied by the Ontario Sewer Pipe Co. The plans were drawn and the work supervised by Mr. T. Lowes of Toronto.

WINNIPEG PLUMBING DEPARTMENT REPORT FOR AUGUST

The accompanying table contains a report of the work carried out by the Winnipeg plumbing and sewer department.

The department evidently has an up-to-date system of inspections, which is proved by the previous reports that have appeared in SANITARY ENGINEER.

These reports prove also the necessity of systematic inspection and its value to the city dwellers. They prove that the health and welfare of every citizen is being guarded in no small degree by such a department.

WINNIPEG PLUMBING DEPT. REPORT FOR AUGUST

Plumbing Division

Inspections			Permits issued	
			65	
Water tests	Smoke tests	Subsequent inspections	Miscellaneous inspections	Defects rectified
39	86	155	10	105

Sewer Division

Permits issued	Connection constructed	Inspections
11	7	46

Flushings

Tank flushings, gallons	Hose flushings, gallons	Total gallons of water
1,186,304	704,375	1,890,679

FORMULA FOR SUCCESS

The formula for the successful business man is the same as for all earthly endeavors. Love your business and the work which you are here to perform; be endowed with an imagination that can build an ideal for you to work towards, and then be blest with a continuity of purpose that can and will make your dreams come true.

MARKET CONDITIONS AND TENDENCIES

(Conditions from page 27.)

during the week so far as prices are concerned due to the absence of buying. A fairly good demand is reported in some quarters for aluminum. Tin was unsettled owing to the erratic condition in the primary markets.

COPPER.—There was an easier feeling in the copper market during the week due to the expectation that the prices likely to be established by the United States Government will show lower levels. Locally prices were quoted at 30c for casting copper, which shows an easier tendency.

TIN.—There was an unsettled condition in the tin market during the week, a fluctuation in price in the primary markets having been noted. Locally there was no alteration in quotations at 63c to 65c per pound.

LEAD.—Business in lead is reported quiet and prices showed no disposition to change during the week. In the primary market there was also a dullness reported. Locally prices held at 13½ to 14c per pound.

SPELTER.—The market for spelter was weaker and prices were quoted at 10c to 10½c per pound, representing ½c decline.

ANTIMONY.—Demand for antimony is very light and prices were down during the week to 18c per pound, a decline of 2c.

ALUMINUM.—A good demand for aluminum is reported in some quarters, but in other quarters a dullness. Prices were down and ranged from 60c to 64c.

PIG IRON.—There is little change in the situation in pig iron during the week, as quotations were still withdrawn by Canadian mills. In the United States there is an uncertain condition but carrying costs have been increased by 15 per cent. due to the granting of a higher freight rate by the Interstate Commerce Commission.

New Patents

No. 176,299.

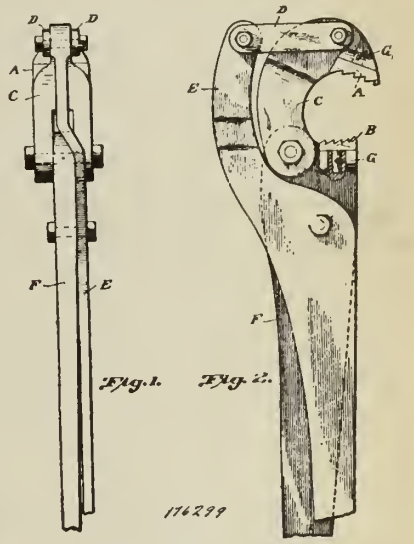
Randolph W. Shipley, Drumright, Oklahoma, U.S.A., 10th April, 1917; 6 years. Filed 23rd January, 1917. Receipt No. 274,734.

Claim.—1. A pipe wrench comprising a shank having a stationary jaw, a movable jaw pivoted at one end to the shank and having a jaw face on its other end opposing the stationary jaw, an operating lever pivoted between its ends to the shank, said lever having its outer end terminating adjacent the outer end of the movable jaw, and a link arranged transversely of the shank and connecting the said outer end of the lever to the said outer end of the movable jaw to exert a tangential push on said movable jaw.

2. Pipe tongs comprising a shank having a fixed jaw on one end, a movable jaw pivoted to the end of said shank adjacent the fixed jaw provided with a face overhanging and opposing the latter, and an operating lever pivoted to the shank and connected to the movable jaw, the latter serving as a stop for the pivotal movement of the lever.

3. Pipe tongs comprising a shank having a fixed jaw on one end, a movable jaw pivoted to the end of said shank adjacent the fixed jaw and provided with a face overhanging and opposing the latter, an operating lever pivoted to the shank and extended to a point substantially opposite the outer end of the movable jaw whereby a force exerted on the lever will be transmitted substantially tangential to the movable jaw, and a connecting link between the outer end of the movable jaw and said extended end of the lever.

4. In a pipe wrench, a shank having a fixed jaw, a movable jaw having a bifurcated part straddling the shank and pivoted thereto, an operating lever pivoted to the shank and having its outer end disposed approximately opposite to the outer



No. 176,299. Pipe Tong.

end of the movable jaw, and a link connected to the lever and outer end of the movable jaw.

5. In a pipe wrench, a shank having a fixed jaw to grip one face of a pipe, a pivoted jaw connected to said shank to grip the opposite face of the pipe, and means for applying a tangential clamping force to the pivoted jaw including a rigid link disposed at points outwardly yond and opposite said second-named face of the pipe.

6. A pipe wrench including a shank having a fixed jaw, a curved element pivoted at its inner end to the shank adjacent said fixed jaw and having a jaw at its outer end confronting said fixed jaw, an operating lever pivoted to the shank and having its outer end curved and extending over and beyond the curved element, and a link arranged at substantially right angles to the shank and pivoted to the extremity of the curved outer end of the lever and the outer end of said curved element.

As the future always holds problems to prepare for, the word preparedness is likely to be given as hard a run as efficiency was.



THE HYDRAULIC RAM

In response to an inquiry from one of our readers concerning the operation, etc., of the hydraulic ram, we have pleasure in reproducing an article covering same which appeared in our columns some years ago, believing that by doing so the information will be appreciated by others as well.

The principles underlying the construction and operation of the hydraulic ram were recognized as early as 1775 by John Whitehurst, who in that year communicated to the Royal Society a paper describing a machine of a similar type in which the overflow or waste valve was operated by hand. The next improvement was made by a Frenchman, Joseph Michael de Montgolfier. He was the first to see that variable pressure produced by changing the velocity of a column of water, could be utilized to operate the valve. Since that time, although numerous improvements have been made in the way of securing quick action of valves by aid of springs and weighted levers, the ram is essentially the same as in its earliest form.

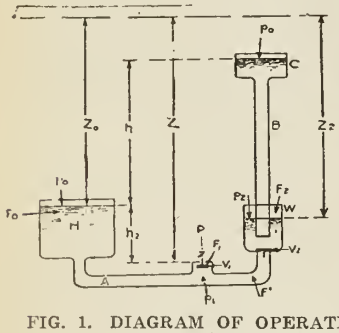


FIG. 1. DIAGRAM OF OPERATION OF HYDRAULIC RAM.

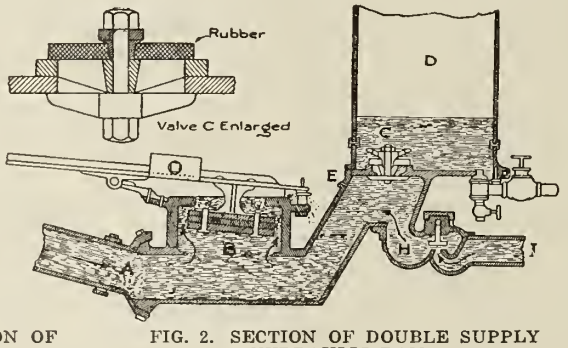


FIG. 2. SECTION OF DOUBLE SUPPLY HYDRAULIC RAM.

A drive pipe A, Fig. 1, takes water from a source of supply H, to a chamber which contains the valve V. This valve, which opens inwardly, is called the waste or overflow valve. In another part of the same, or communicating chamber, is a check valve V, which leads to the tank into which water is being forced and which has a water level considerably above that of the supply tank. When V is opened, the column of water in the drive pipe is set in motion, and will finally attain a velocity which builds up a pressure under V sufficient to close the waste valve. The energy of the moving mass in the drive pipe cannot immediately be dissipated, therefore, the pressure in the chamber rises and lifts the check valve, allowing some of the water to enter the air chamber W, compressing the air and forcing an equal amount of water into the tank C. When the water in the drive pipe comes to rest, V_2 closes, V_1 opens, and the cycle is repeated. The pressure may for an instant be slightly less than atmospheric, and advantage is taken of this to introduce a small amount of air through an air valve. This air replenishes any part of the supply in the air chamber which may be carried out with the water.

Although the ram may have a high efficiency, it is wasteful of water, and the form shown in section in Fig. 2 has been devised to pump pure water with a minimum of waste. Connection is made at A to the source of waste water, which may be any polluted water available. The connection to the potable water should preferably come from a source under slightly greater head than the impure water. In this ram the waste water consists mainly of that entering at A but, in part from that entering at I and, if the capacity of the space between the waste valve B and the check valve C is greater than the amount of water delivered per pulse, no impure water can enter the chamber D. In this ram the air valve is placed at E.

The hydraulic ram lends itself readily to variable demand, which can be met by either changing the weight of the waste valve or adjusting its stroke. Its greatest field is in the water supply for small towns where the cost of maintenance and attendance must be kept as low as possible.

CORRECTION

If our readers turn to the foot of first column on page 32, Aug. 15, issue, they will find that referring to the amount of water necessary for lawn sprinkling, the following words appear:

"These figures, however, do not allow for lawn sprinkling. It is estimated that during the summer months a lawn requires about ¼ of one inch of water per week including any rain fall that comes."

The above should have read:

"It is estimated that ¼ inch depth of water covering the whole area of lawn is required at least every week during dry spells."—Editor.

KEWANEE BOILER CO. GIVES EMPLOYEES BONUS

At the beginning of this year the Kewanee Boiler Co., of Kewanee, Ill., posted notices to the effect that all employees, who worked 90 per cent. of the time during 1917, would at the end of the year receive a bonus of 10 per cent. on their regular salaries or wages. Owing to the fact that business has been exceptionally good, the company last week decided to distribute to all its employees this bonus of 10 per cent. for the first six months of the year, that is, to those who have worked 90 per cent. of the time. During the balance of the year this bonus will be added to their regular pay and they will receive it weekly.

There are quite a number of manufacturers of such supplies as are used by this profession that find such schemes of mutual benefit to all concerned, which proves at least that this good old world will soon be even better place than ever for the human being to live in.

Stack Black—For smoke stacks, engines, boiler fronts or any object exposed to extreme heat, the following mixture is suggested:—

7 lbs Ferrubron Powder.
1 lb. Carbon Black.
2½ lbs. Boiled Linseed Oil.
1 lb. Turpentine.
1 lb. Coach Varnish.

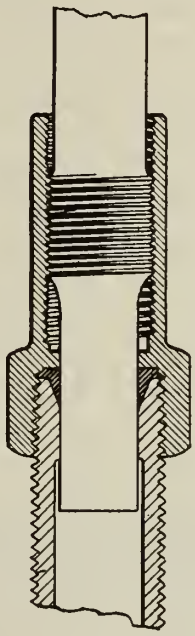
The last three items are quoted by weight instead of by liquid for convenience.

ADJUSTABLE

Screw Joint Coupling

for Supply Pipes

(Letters Patent No. 162,577)



The illustration shows the principle of application. The threaded shoulder on supply pipe engages internal thread of Screw Joint Coupling, allowing a total adjustment of TWO INCHES.

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The Adjustable Screw Joint Coupling represents a combination of Common-Sense and Experience. It has justified expectations that it would perform an ordinary service in an extraordinarily efficient manner.

Fitted on all Noblo Supplies.

Manufactured by

H. Mueller Manufacturing Co., Limited

SARNIA, ONTARIO

NEW CANADIAN PATENTS

(Continued from page 20.)

thereof near the cutter a pair of relatively movable parts for engaging the interior of a valve casing and holding the cutter bar to said casing, one of said parts being carried by a slide movable lengthwise of said cutter bar, and means for shifting said slide to and maintaining it in any one of a plurality of different adjusted positions.

5. A tool of the class described, comprising a cutter, an associated cutter bar, and a movable element on the cutter bar and shiftable lengthwise thereof and co-operative with the end of the cutter bar nearest the cutter for engaging the interior of a valve casing at two different points and holding the cutter bar to said casing.

6. A tool of the class described, comprising two main members one of which is a cutter and the other an associated cutter bar, means for weighing said tool in place between a pair of separated surfaces of a valve casing, and means near the cutter for holding said cutter bar to the interior of said valve casing against movement in a direction lengthwise of the cutter bar.

7. In a tool of the class described, a cutter bar having a plurality of relatively movable parts for engaging the interior of a valve casing and holding the cutter bar to said casing and means for effecting relative movement of said parts.

8. In a tool of the class described, a cutter bar having at different points in the length thereof a pair of relatively movable parts of engaging the interior of a valve casing and holding the cutter bar to said casing one of which parts is a fixed element and the other of which is carried by a slide movable lengthwise of said cutter bar, and means for adjusting and holding said slide.

9. In a tool of the class described, a cutter bar having a plurality of relatively movable parts for engaging the interior of a valve casing and holding the cutter bar to said casing, and means for effecting relative movement of said parts from a point near the outer end of the cutter bar.

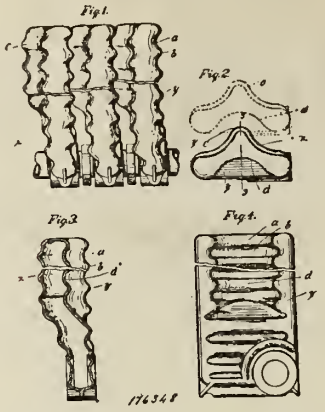
10. In a tool of the class described, a cutter bar having at different points in the length thereof a pair of relatively movable parts for engaging the interior of a valve casing and holding the cutter bar to said casing one of which parts is a fixed element and the other of which is carried by a slide movable lengthwise of said cutter bar, and a feed screw.

No. 176,348.

The H. B. Smith Company, assignee of William B. Reed, both of Westfield, Massachusetts, U.S.A., 10th April, 1917; 18 years. Filed 14th July, 1915. Receipt No. 253,935.

Claim.—1. A sectional radiator, the walls of each section being transversely and longitudinally corrugated, at least one set of said corrugations being staggered with relation to the corresponding corrugations in the opposing surface of an adjacent section and so positioned as to overlap, thus eliminating a direct path through the radiator between the sections.

2. A sectional radiator, the opposing walls of adjacent sections shaped to produce a reversely curved path between said sections longitudinally thereof, and so

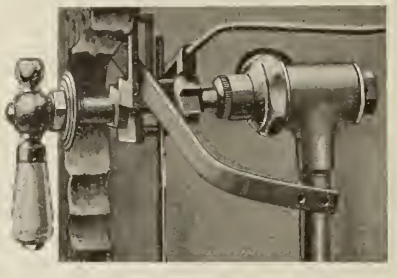


No. 176,348. Radiator.

positioned as to overlap, thus eliminating a direct path through the radiator between the sections.

3. A sectional radiator, the opposing walls of adjacent sections shaped to produce a reversely curved path between said sections transversely thereof, and so positioned as to overlap, thus eliminating a direct path through the radiator between the sections.

4. A sectional radiator, the opposing walls of adjacent sections shaped to produce a reversely curved path between said sections transversely and longitudinally thereof, and so positioned as to overlap,



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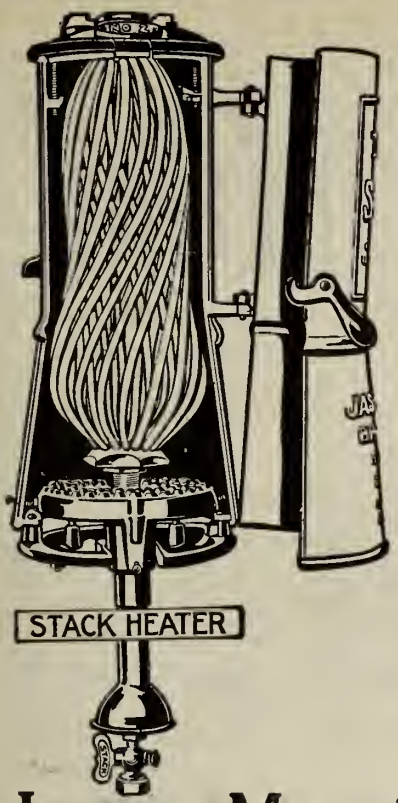
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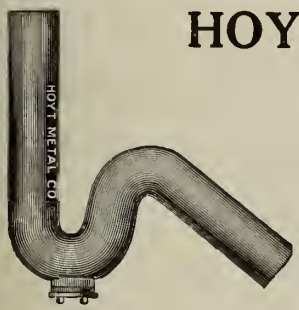
The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited

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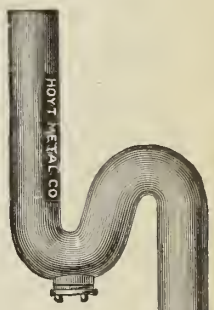
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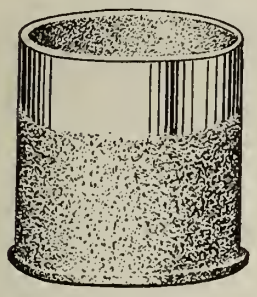
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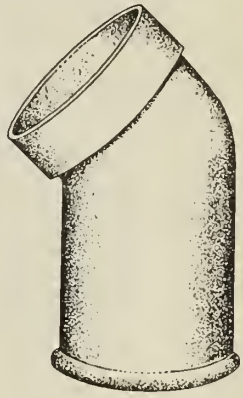


Wiping solder of various quality. None that is not the best value on the market. Easy Wiping is the plumbers' favorite.



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because we guarantee every boiler to live up to the claims we make for them. We assist you to build up a lasting reputation that counts, when we supply you with our goods.

STEEL AND RADIATION, LIMITED

Mfrs. Steel Sash, Concrete Reinforcing, Metal Lath, Steam and Hot Water Heating Systems.

HEAD OFFICE: Fraser Avenue, TORONTO

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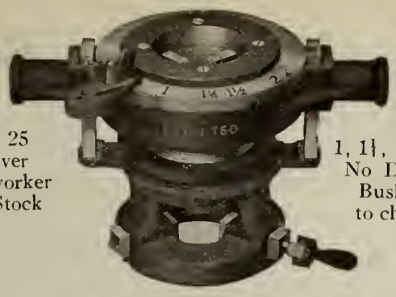
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No. 25 Beaver easy-worker Die Stock

1, 1¼, 1½, & 2 No Dies or Bushings to change

You Don't Pay for "Beavers" —

THEY PAY FOR THEMSELVES

Figure it out for yourself! Thousands of Beavers have been in constant use for nearly 10 years—and are still good.

The cost works out at about ½ cent a day for the tool shown in this advertisement.

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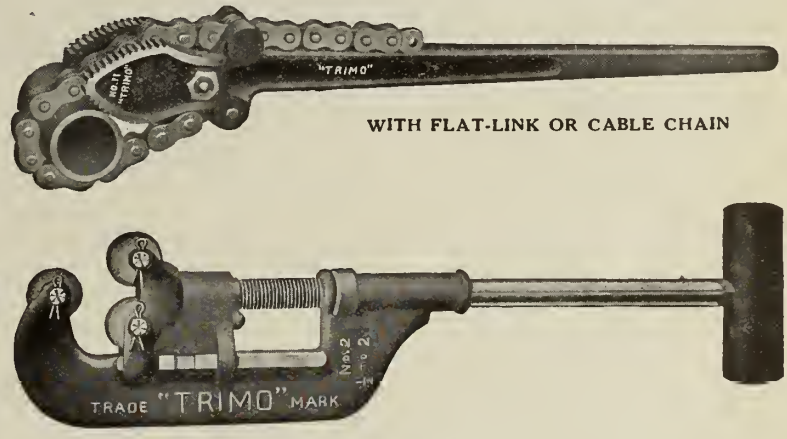


Only the penny wise begrudge the price of "VULCAN" sufficiency. Experienced buyers will take nothing else.

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World-Famed Specimens of the Age of Steel

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WITH FLAT-LINK OR CABLE CHAIN

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Rolf Gas Water Gas Heaters

No. 0 to 3 Series



Only the best materials, heavy copper tubing, Armco rust-resisting iron, and expert workmanship enters into Rolf Heaters.

They are high in efficiency, low in cost. Substantial Construction.

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Air Valves.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
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H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
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Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Brass Pipe and Tube.
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Canadian Wolverine Co., Ltd., Chatham.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Drainers.
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James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Trimont Mfg. Co., Roxbury, Mass.

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Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., Ont.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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C. A. Dunham Co., Ltd., Toronto.

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Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

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James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

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National Equipment Co., Ltd., Toronto.

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Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

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Canadian Machinery Co., Ltd., West Toronto.
Empire Mfg. Co., Ltd., London, Ont.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
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Canadian Brass Co., Ltd., Galt, Ont.
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Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
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Lord & Burnham Co., Toronto.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
Speakman Supply & Pipe Co., Wilmington, Del.

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Trimont Mfg. Co., Roxbury, Mass.

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National Rotary Oil Burner Co., Boston, Mass.

Oil Storage Systems.
National Equipment Co., Ltd., Toronto.

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Canadian Wolverine Co., Ltd., Chatham.

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W. E. Clark & Co., Toronto.
Kerr Engine Works, Walkerville.

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Beaton & Corbin Mfg. Co., Southington, Conn.

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Canadian Tube & Iron Co., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Pipe Cutters.
Trimont Mfg. Co., Roxbury, Mass.

Pipe Joint Compounds.
Canadian Wolverine Co., Ltd., Chatham.
James Morrison Brass Mfg. Co., Ltd., Toronto.

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Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Toronto Hardware Mfg. Co., Toronto.

Pipe Threading Tools and Machinery.
Borden Canadian Co., Toronto.
John Hall & Sons, Ltd., Brantford.
A. B. Jardine & Co., Hespeler.

Pipe Wrenches.
Borden Canadian Co., Toronto.
Trimont Mfg. Co., Roxbury, Mass.

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Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Pumps.
Canadian Machinery Co., Ltd., West Toronto.
C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

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Beaton & Cadwell Mfg. Co., New Britain, Conn.,

Radiator Traps (Steam).
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Dart Union Co., Ltd., Toronto.

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W. E. Clark & Co., Ltd., Toronto.

Vent Caps
Malcolm Co., Toronto.

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Canadian Machinery Co., Ltd., West Toronto.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto



154 *Wolff Factory Enameled Lavatories as installed in the Joseph Ryerson Plant, Chicago.*

Quality of Materials and the Workmanship

establish the value of plumbing. If faulty in either particular there is financial loss to the building owner, and reputation loss to architect, contractor and plumber. For over 60 years Wolff Plumbing has been representative of highest quality and perfect workmanship. Its installation is an assurance of complete satisfaction. Why take chances with any other kind?

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Manufacturers of Plumbing Goods Exclusively

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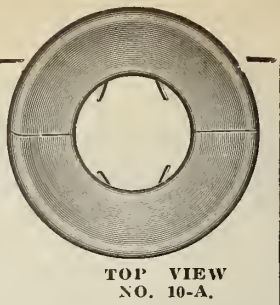
CHICAGO

SHOWROOMS
111 N. Dearborn St.



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.



Gem No. 4.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

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ADVERTISING to be successful does not necessarily have to produce a basketful of inquiries every day.

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BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.

All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES Black and Galvanized All Sizes

Ask your jobber for CT Brand

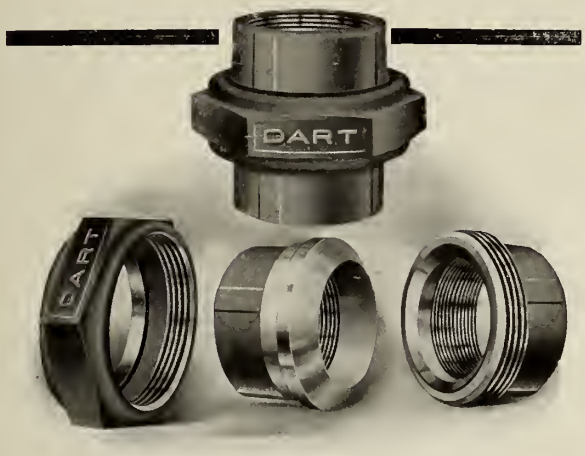
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Montreal Works: Lachine, Can.

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THINK THIS OVER when ordering your next lot of supplies.

The Part of a Pipe Line That Never Leaks



DART UNION PIPE COUPLINGS

are permanently efficient because both faces are

BRONZE

No Deterioration

Iron Parts Are Heavy

No Stretching or Pulling Apart

And they are easily connected whether pipes are in or out of line.

Dart Union Pipe Couplings never bother customers and they save you much time, labor and worry. There is a "Dart" for every need.

YOUR JOBBER SELLS THEM

Manufactured by

DART UNION CO., Limited

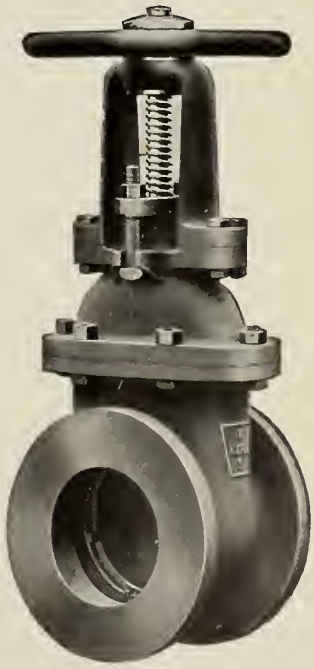
TORONTO, CANADA

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

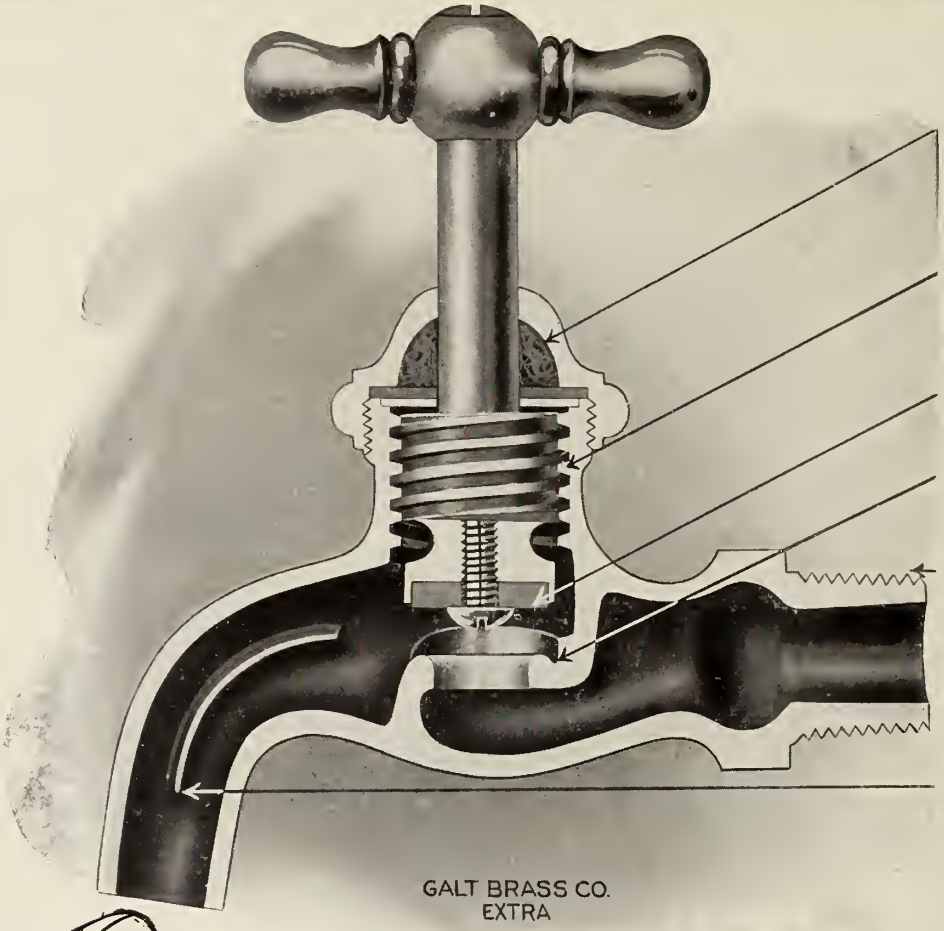
Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

Approved by the Fire Underwriters Association, and Registered by Boiler Inspection Departments of Ontario, Saskatchewan and Alberta.

THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Registered **PERFECTO** Trade Mark

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, SEPTEMBER 15, 1917 | No. 18

FULL WEIGHT METAL

EMPIRE VALVES

THE EMPIRE LINE

Look for the letter E when you want to be sure of Excellency in design, Excellency in service and Excellency of quality.

Every valve made by us bears the letter E, and will withstand all that is required of such valves.



Accurate Threads

Look for the **E** on every Valve



When you buy radiator valves they should be properly designed. Many are there on the market that look alike, but do not work alike, do not stand the strain put upon them, and have not the uniformity of combinations that go to make up a Valve of Quality.

Empire Mfg. Company
LIMITED

LONDON ONTARIO

TORONTO ONTARIO

TIP-TOP QUALITY

FILE COPY

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

ONTARIO:
Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Service First

Nothing can impress a purchaser more favorably toward any article than the assurance that it will give satisfactory service. That explains why the Dominion Rubber System has gained such a strong hold among purchasers of rubber supplies.

Each Dominion Rubber System product, no matter what its use, is made to "stand up" under the severest tests. A half century's experience in manufacturing everything in rubber has taught us to know "what's what" in rubber and how to make a finished product that will give satisfactory service.

The surest way to prove our claims is to put us to the test. Our nearest branch will give your requirements prompt and intelligent attention.

Canadian Consolidated Rubber Co.
Limited

Head Office - - MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Brandon, Regina, Saskatoon Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

ONE MAN DOES WORK OF TWO
WITH THE
"Jardine" and "Toledo" Pipe-Threading Tools



"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of **"JARDINE"** OR **"TOLEDO"** DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear, too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

WRITE FOR CATALOG OF COMPLETE INFORMATION.

A. B. JARDINE & CO.
HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.

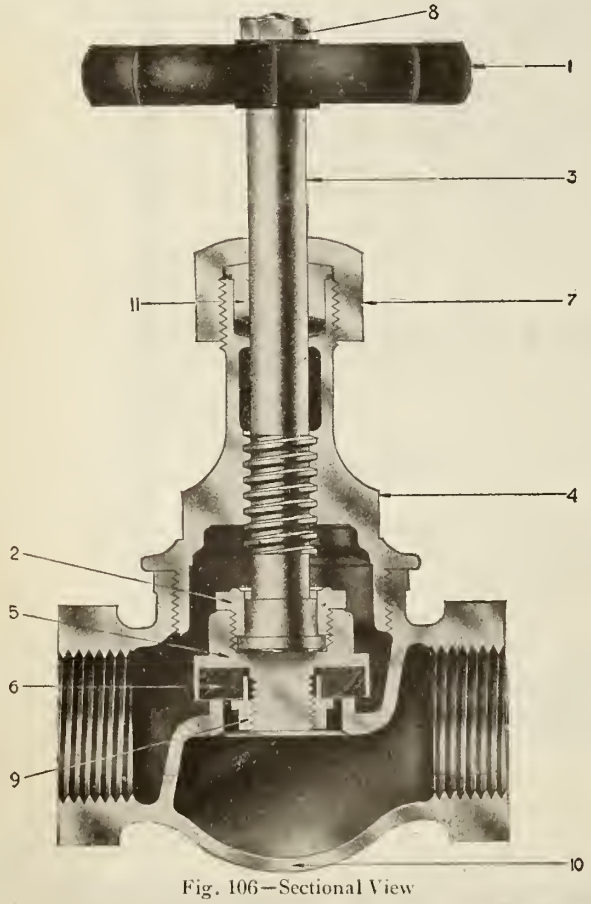


Fig. 106—Sectional View

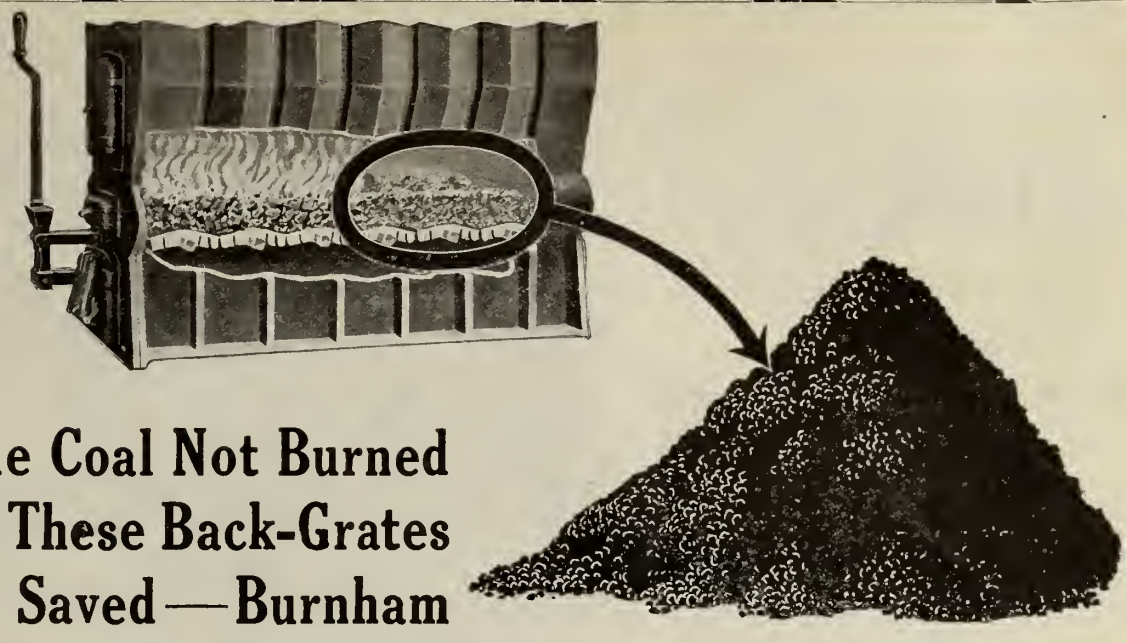
For use under cold water service there are no valves quite as satisfactory as

Jenkins Bros.'
Globe *and* Angle Valves
fitted with Jenkins' No. 93 Discs

The flexibility of the disc assures a perfectly tight seat and the composition is tough, non-corrosive and durable.

WRITE FOR CATALOGUE NO. 8.

JENKINS BROS. Limited
103 ST. REMI STREET, MONTREAL



The Coal Not Burned on These Back-Grates Is Saved—Burnham Grates That Shake Half-at-a-Time Make Back-Grates Coal Savings Possible

IN mild weather half the fire is often all that is needed to keep things comfortable. But in most boilers it is necessary to keep **all** the fire going in order to get the half fire that is actually needed. Nothing like that with the Burnham Boiler.

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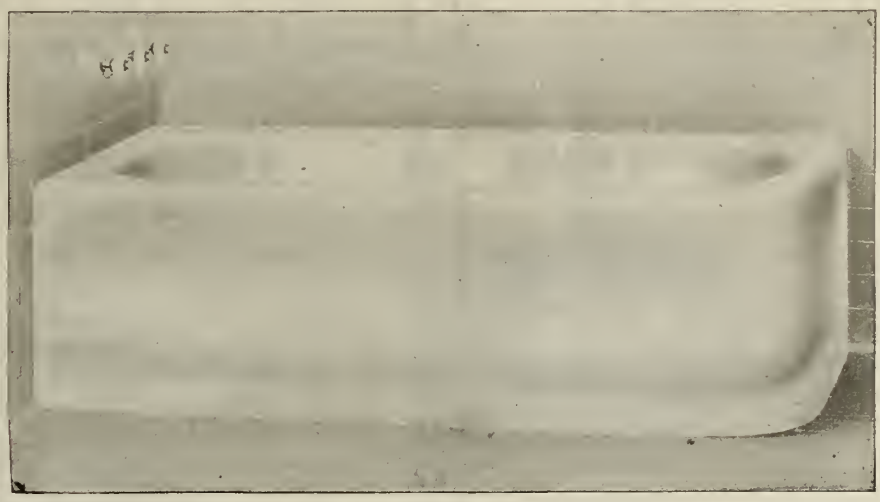
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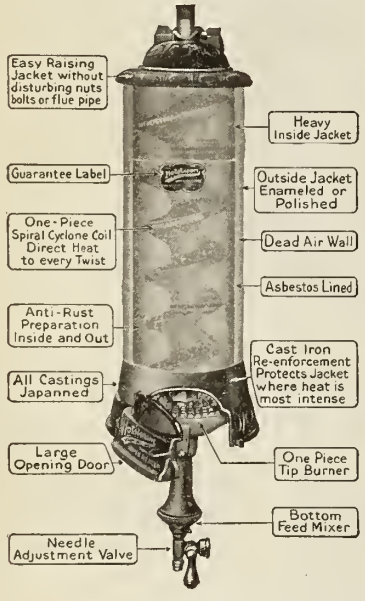
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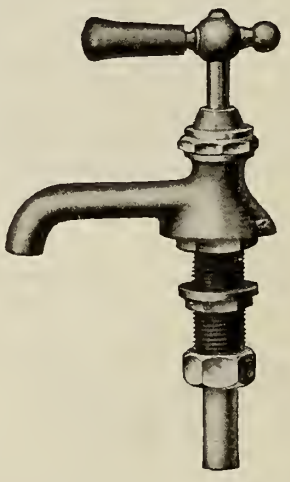
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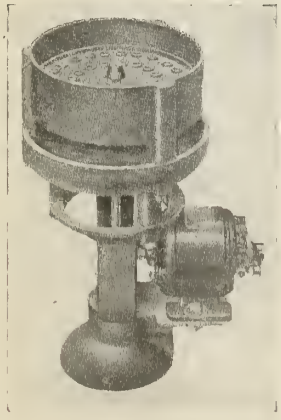
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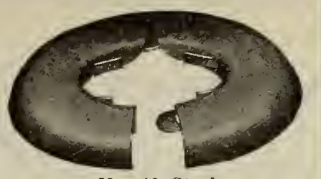
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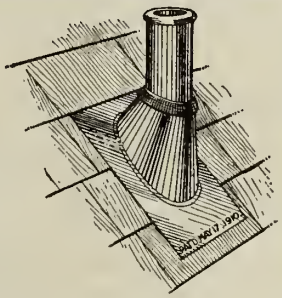
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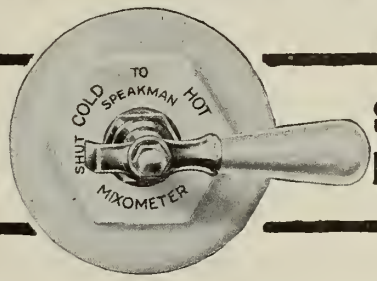
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THE SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, SEPTEMBER 15, 1917 No. 18

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EDITORIALS

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MacLean's Magazine

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Northcliffe

THE Big Feature is Lord Northcliffe's article—Federation after the War. This brilliant and mighty publisher and world-figure deals with the question of a federation of Great Britain and the United States, and of Canada's relation to such a federation.

It is a big thing for MacLean's to get this special and exclusive article from Lord Northcliffe, and the inference is: This great journalist and man of affairs deemed MacLean's worthy of his writings.

Lord Northcliffe is only 54 years old. In the years ahead he and his powerful papers, the *London Times* and *London Daily Mail,* will play a big part in the shaping of the Imperial State.

MacLean

COLONEL JOHN BAYNE MACLEAN is a notable contributor, writing of the causes of the war, and of the post-war reconstruction as it relates to Canada.

Colonel MacLean discusses the steps that should be taken to win the war, and deals with the financial measures that Canada must consider for the after-the-war period.

Colonel MacLean is pre-eminently well-informed, and his long and intimate connection with International and Domestic financial affairs makes what he writes challenging and illuminating.

Harold McGrath's Great Story of Adventure and Mystery

This world-famous fiction-writer contributes a complete novelette—"The Rubies of Perak."

Other notable contributors are Stephen Leacock, Miss Laut, W. W. Jacobs, Allenson, Moorhouse, and J. D. Ronald, who tells of a smuggling enterprise by an American who temporarily fooled the Customs Department when he imported the plant for a new factory in a Canadian City.

"The Gun Brand," by Hendryx, a great story of the Canadian Northwest, is a feature of the September *MacLean's.*

Three features liked by business men are the "Review of Reviews" Department, where the best things in the current magazines of the world are condensed; the "Business Outlook" article, and the Department, "Information for Investors."

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SANITARY ENGINEER

VOL. XI SEPTEMBER 15, 1917 No. 18

Pipe Scandal at Ottawa

Specifications For New Parliament Buildings Stipulate Wrought Iron Piping—Inferior Material For the Purpose—Costs More Money—Sanitary Engineers Should Protest.

IF any patriotic Canadian were asked to mention one edifice in the whole of Canada in which the building material and fittings should be of the very best, on which no expense should be spared to make it second to none in the Dominion, he would without doubt designate the Parliament Buildings at Ottawa as pre-eminently worthy of such consideration.

It will, therefore, come as a shock to sanitary engineers to learn that either designedly or from sheer ignorance it is proposed to instal in the new buildings at present under construction, a type of piping which has beyond dispute been proved unfit for the purpose for which it is to be used. We refer to the use of wrought iron or steel pipe for soil pipe, waste pipe and drainage systems.

We have not the remotest idea as to who is responsible for the specifications of the requirements for the sanitary fittings, but these specifications undoubtedly prove to the mind of any well-informed and responsible sanitary engineer who knows his business that the person or persons responsible are utterly incompetent to supervise the work which they are attempting to have carried out. We do not expect our law-makers themselves to possess the qualifications of expert sanitary engineers, but the citizens of Canada, who in the final analysis pay for the work, do expect their government to receive the best and most reliable advice it is possible to obtain, more especially in such a matter as sanitary equipment which may affect the health and even the lives of our legislators. This expectation in the present instance appears to be far from being realized. In fact, judging from the specifications referred to, we have no hesitation in saying that the powers that be are, in the matter under discussion, being grievously misled (it may be only through ignorance) by those in whom they have put their trust.

In case any of our readers have any doubts as to the unsuitability of wrought iron pipe for drainage or sewer purposes, we would refer them to another article in this issue entitled "Important Elements of Sanitary Plumbing," in which the matter is dealt with at length. Two instances are there mentioned which bear out our contention.

At Pullman, Illinois, some 35 years ago, more than a thousand family residences were erected and the Durham method of plumbing was used. By 1900 the wrought iron pipe used was in such a bad condition that the Pullman Co. had to take out the wrought iron installations and replace them with cast iron, whereupon the death rate was immediately reduced.

Mention is made of the Waldorf-Astoria Hotel, one of the most popular hotels in the world, which has been confronted with an emergency problem caused by the necessity of replacing piping in less than 20 years. When this building was being erected, the question of piping for the work was submitted to a committee of plumbing experts, and although their advice was that cast iron soil pipe be used, the builders used a substitute.

These pipe lines, by the action of gases from the acids and alkalies carried by the sewage have entirely given out. Strong corrosive gases are formed in the decomposition of sewage and the bacterial action which takes place. The damage cannot be figured simply by the cost of replacing the pipe and the ceilings and floors ruined, but includes the resultant loss of use of rooms during reconstruction work. The damage will be a constant one until all the drainage lines are replaced and will run into the hundreds of thousands of dollars.

Fig. 3 of the illustrations accompanying this article, shows another case where wrought iron pipe and cast iron soil pipe were joined together and used in the same 5-inch drainage stack for 18 years.

The wrought iron pipe by "scaling" lost more than 72½ per cent. The cast iron soil pipe was almost as good as when it was installed, and not the slightest corrosive action took place, the loss



A portion of cast iron soil pipe and fitting taken from the old Astor Hotel, New York, after being in use for 80 years, as good as new in every respect.



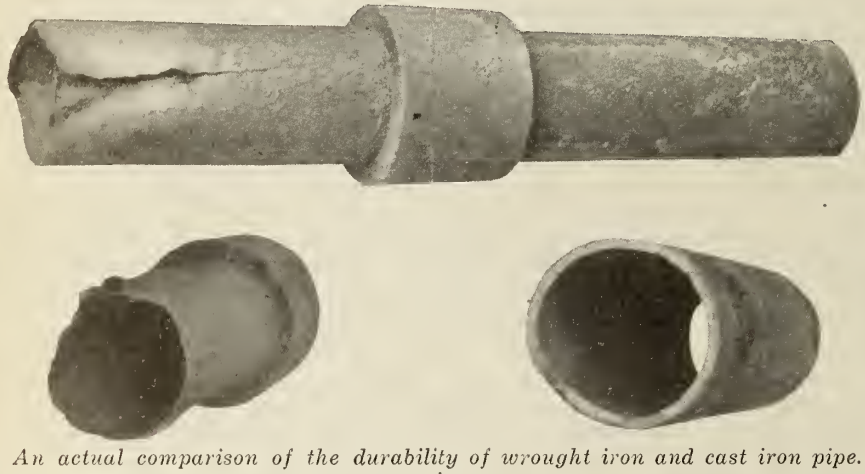
A piece of wrought iron pipe used as a substitute for cast iron pipe, taken from Waldorf-Astoria Hotel, New York, a comparatively new building.

altogether being less than 1 per cent.

Now, on the other hand, consider the service given by cast iron piping. The accompanying illustrations speak for themselves. Fig 1 shows a cast iron soil pipe fitting and piece of pipe that was in use for no less than 80 years in the old Astor House, New York.

The old Astor House was built at a time when there were far fewer impractical substitutes for sound materials than is the case at the present day. The fittings illustrated were found when the building was being pulled down to provide space for a new subway station. In face of such evidence as this, no practical or honest man would attempt to prove that wrought iron pipe would be an improvement on material that has been in use for 80 years, and that in a hotel where soil and waste pipes are subjected to a very severe strain far above that of an ordinary building.

At a time like the present when economy is the universal watchword, there might appear to many persons to be some shadow of an excuse for the use of wrought iron, if such were cheaper than cast iron. But this is not the case. It is a matter of common knowledge that cast iron is the cheaper. When, therefore, a better material for the purpose can be purchased for less money, the action of those in authority in calling for the more expensive is all the more incomprehensible.



An actual comparison of the durability of wrought iron and cast iron pipe. pipe.

The following is a copy of a letter sent by the writer to the Ottawa *Citizen*, in which paper it appeared on Aug. 28:

Editor Citizen:— I just learned that tenders are being asked for by the Public Works Department for what is known as the "Durham System" of plumbing installation to be used in the new Parliament Buildings.

I have been visiting several cities in the U. S. A. recently and one of the matters I took up was to investigate this very problem.

"For years every practical man has condemned the use of this system because of employment of wrought iron and steel pipe for soil pipe, waste pipe, vent pipes and drainage systems. It has been proved without doubt to be unfit for such purposes, but somehow or other the wrought pipe and fitting industries in the United States particularly, have been able to bring pressure to bear upon our building contractors and architects so that their products are used to the detriment of the public at large.

"About 10 days ago I was looking over the piping in the City Hall, Chicago, a building only up 10 years, and found the pipings in a terrible condition. Nearly rusted through and the very structure of the walls of the iron pipe thoroughly broken down.

"It seems too bad that a new Parliament building in our fair capital is to be the dumping ground for American and Canadian manufacturers of such material for the purpose named.

"I would unconditionally condemn the whole sanitary equipment in the new Parliament Buildings if the Durham system is installed. The best that the piping can do will be to last at most 20 years, and will begin to cause serious trouble in about 15 years.

"Hoping that the contents of this letter will receive some attention in your worthy paper, and knowing full well that you are always on the side which protects the public, I am,

"SANITARY ENGINEER."

In face of the overwhelming evidence in favor of cast iron pipe for soil pipes, the Canadian Government should be called upon to put this matter right

In looking over the specifications as far as they concern the sanitary engineering work generally, the writer feels constrained to say that never, in his 29 years connection with the plumbing and heating trade has he seen a set of specifications, so rankly impracticable, so badly drawn up and exhibiting such incompetence and lack of knowledge of the sanitary business on the part of whoever is responsible for them. They are pregnant with impractical requirements, full of loopholes for misunderstandings, teeming with opportunities for evasion, and so vague in meaning that any sanitary engineer with a few years' experience could drive a coach and horses through the stipulations made in pretty nearly every section.

About the only section which is not open to question on the score of ambiguity is No. 1,420, that referring to the piping question and which reads as follows:

"These branches from the house drain and all drainage or fixtures on floors above basement shall consist of extra heavy galvanized wrought iron."

There are no arguments in favor of wrought iron for piping whether galvanized, extra heavy, or otherwise, simply because its life at the outside is not likely to be more than 20 years and under certain conditions serious trouble may be experienced before 15 years have passed by, owing to the action of sewer air and foul gases, and the acids and alkalies carried in the sewage.

It behooves every sanitary engineer to register his protest against the use of such material. If it were possible to place the matter before the member or members of the Government who are responsible, it should not be a difficult matter to have new specifications drawn up stipulating for cast iron pipe instead of wrought iron. The latter costs more and is dear at a gift for this purpose. The former will last as long or longer than the building and will result in the saving of money.

Many of you readers will, no doubt feel and express yourselves as follows: "What you say is quite right, but what can I do in the matter? I am powerless and can do nothing." This, reader, is where you are wrong, here is something you can do, write us a letter on the subject. Back up your trade paper in its effort to put this matter right. Let every sanitary engineer worthy of the name drop us a line endorsing the stand we are taking, and if you can do no more you can at any rate rest assured that you have at least done something, however small, to vindicate the honor of the craft.

BOOK FOR SHEET METAL WORKERS

A new book has just been published entitled "Triangulation," applied to sheet metal pattern cutting. It is one of the most complete books of its kind ever published, explaining in a very simple manner the theory of triangulation.

There are thousands of sheet metal workers who have not learnt the principles of pattern cutting by triangulation, many would find the method much easier if a book such as this one had been procurable in their apprenticeship days.

It is a book of twenty-seven chapters, and contains more than 250 pages, every page bristling with valuable information written in a very simple manner.

Further particulars may be procured from The Sheet Metal Publication Co., New York, or to The Maclean Publishing Co., Ltd., University avenue. Toronto.

Echoes from the American Society of Sanitary Engineering

SOME of the resolutions adopted by the members of the American Society of Sanitary Engineering recently will be of interest to readers of SANITARY ENGINEER.

Resolution No. 4, regarding the use of clay tile drain pipes reads:

Whereas, the use of tile for house drains has been the means of great expense to property holders, of disfiguring streets and lawns, of great inconvenience to foot travellers and a source of pollution to the ground due to roots entering and stopping pipes and due to breakage owing to the ease with which it is broken by settling ground,

Be it resolved, that the American Society of Sanitary Engineering reaffirm its position as condemning the use of pipe for house connections to sewers, and,

Be it further resolved, that this Society is firmly convinced that the plumbing trade and the public should be put in possession of the findings that our experts have discovered in various parts of the country

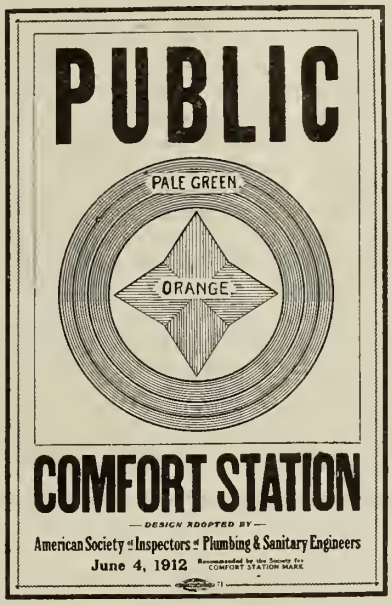
Resolution on Latrines No. 5

Whereas, a school board of a Virginia city was only prevented from installing latrines in a school building, and,

Whereas, it has been demonstrated irrefutably that they are a nuisance on account of unavoidable stench, of large fouling surface accessible to flies and of early failure of flushing outfits and waste of water and of being conducive to diseases of a variety of character,

Be it resolved, that the American Society of Sanitary Engineering reaffirm its condemnation of this type of fixture expressed at its various meetings in 1908, 1910 and 1913.

Be it further resolved, that our members bring this position of the Society to the attention of school boards and newspapers in their home cities so that the findings of experts on this disease-breeding menace may be the means of its elimination from consideration for use in all public buildings.



Comfort Station Emblem

Resolution 7

That efforts be made by the members of the American Society of Sanitary Engineering to have comfort stations installed in all cities and towns, the expense of installing the same shall be shared by the cities and counties where located, each paying half the cost, and all stations be designated by the official mark of this association.

LETTERS TO THE EDITOR

Editor SANITARY ENGINEER.

The Government Engineer and Architects have been calling for tenders for the plumbing to be installed in the new Parliament Buildings at Ottawa, and the new specifications call for "extra heavy wrought iron galvanized pipe." What is the use of our government calling upon everyone to practice thrift and save our money, while they are wasting money so wantonly?

You must be aware, Mr. Editor, that it is nothing short of a scandal in the eyes of practical men, when they know that such pipe as specified is a great deal costlier and not a thousandth part as good as cast iron soil pipe.

Another thing, Mr. Editor, some time ago you called to the attention of readers of your journal that alien architects and engineers had been given preference by Canadian manufacturers, and that these men did not know and were very seldom familiar with goods made in Canada, but here we have a case where the government of our country, or some of our government officials have engaged a consulting engineer, formerly an American, and in spirit one yet, to lay out a system of plumbing, that will require special fittings which cannot be procured in Canada. I have also learned that although there are some concerns in the United States who make similar fittings, they have stated that to follow specifications out, a still further special fitting will have to be made. The reasons for this are as follows:

Extra heavy galvanized wrought iron pipe is smaller in the bore than regular wrought pipe, and all standard screwed drainage fittings are recessed in such a way as to provide an opening in the body of the fitting the same size of the pipe.

In this case, the bore in the body of the fittings will have to be made smaller, or else sewage will lodge in the lower part of every fitting.

All these special fittings and extra heavy piping are being specified for no other reason than to swell the commission for the contractors, who I understand have taken the whole work of putting up the new Parliament Buildings on a percentage basis.

Such a policy is really putting into practice the popular saying: "The public be damned"

AN OTTAWA READER.

NEW BOOK ON HEATING

A new booklet is being issued by the C A. Dunham Co., Toronto, describing their vapor system of heating. It contains some splendid selling arguments that can without doubt be turned to good account by every heating engineer in the trade.

It is just such literature that will help build up one's business, if thoroughly studied and applied in a practical manner.

These booklets will be mailed by the above company upon request to anyone interested.

NEW BOOKLETS

The Sanitary, Heating, Engineering Co., 535 Bank St., Ottawa, have issued recently, a booklet entitled, Health, Heat, Economy. It contains some very useful information describing a new system of heating appliance comprising a base to fit an ordinary hot water, steam or warm air furnace. Part of the base contains a number of water pans from which humidity is procured. There is also an oxygen burner fitted to the apparatus as far as can be learned the whole combination bids fair to be a great success.

An old hen was pecking at some stray carpet-tacks in the yard. "Now, what do you suppose that hen is eating those tacks for?" said Henry. "Perhaps," rejoined his little sister, "she's going to lay a carpet."

It is a whole lot easier to tell how a thing ought to have been done than to tell how it ought to be done—and there still remains the difficulty of doing it.

Sewage Systems for Country Homes

As This Subject is Very Timely, and a Great Number of Farmers and Rural Residents Are Having Sanitary Appliances Installed at This Season of the Year, the Following Article Will be of Particular Interest to Readers of Sanitary Engineer.

NO subject has become as important of late as has the disposal of sewage in country districts. Years gone by it was thought that so long as the discharge from plumbing fixtures was run into a large enough hole, called a cesspool, or into a nearby running stream, lake or waterway that it was the best way.

Sanitary engineers have learned that such however are not sanitary methods, and that sewage so buried is not by any means disposed of, but only held hidden to become a serious menace to those residing in the vicinity. They have also learned that to live up to the title and responsibility of "sanitary engineers" their work must all be in accordance with the best known and progressive practices.

Realizing this, we are publishing a short treatise on sanitary sewage disposal, known as the biological method of disposal, a method which allows nature to perform her own laws. This method, of course, requires to some extent a certain amount of assistance, certain appliances that can be built and installed by sanitary engineers if the following instructions are carefully adhered to.

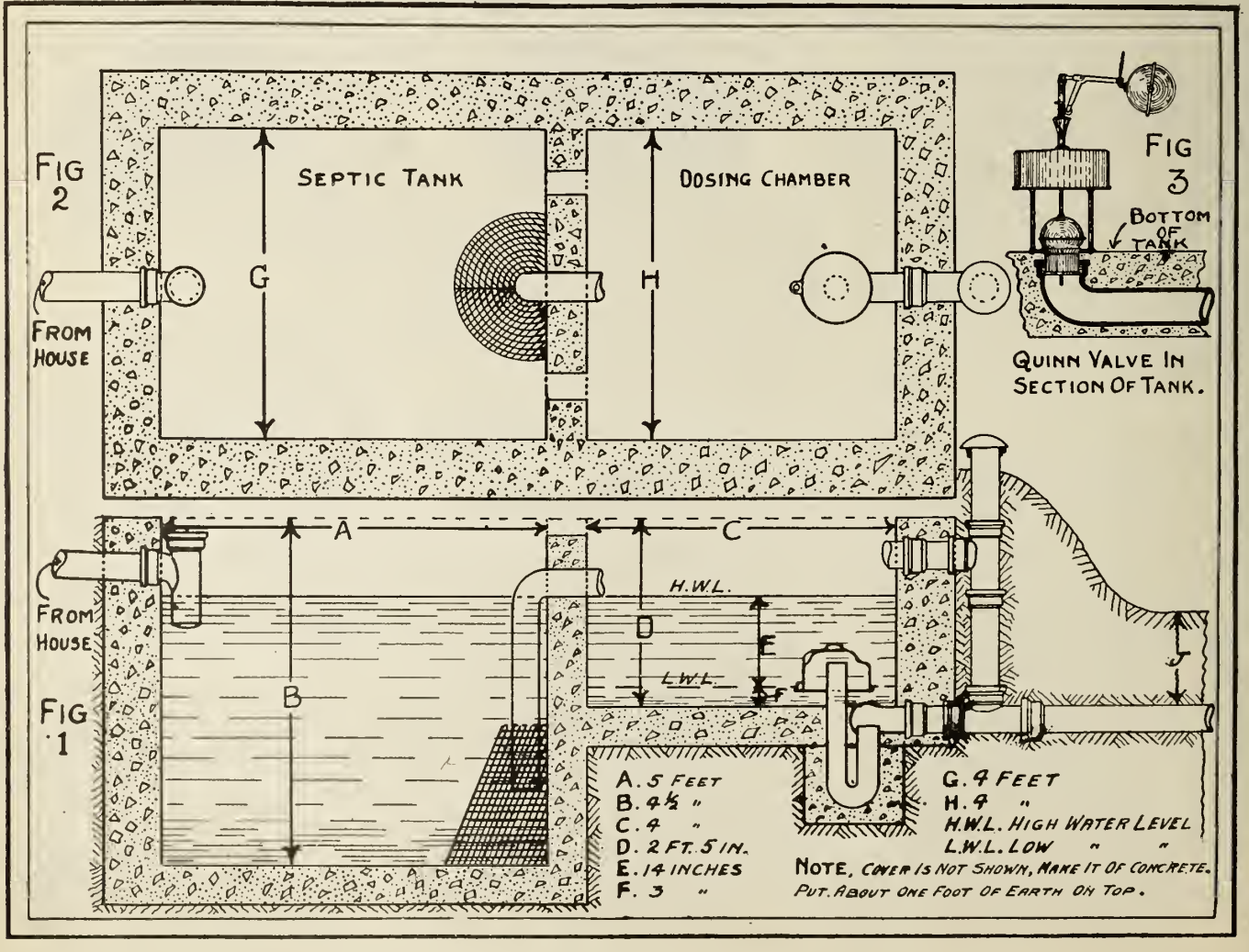
The Septic Tank

First of all, a septic tank is needed. This is comprised of a tank with two compartments, as shown in Fig. 1. One compartment is really the cultivating chamber, the other the dosing chamber. The former is called the cultivating chamber, because the first type of germs is cultivated therein; the latter because there is little, if any, action taking place in that chamber.

It is also the compartment in which the discharging appliance is installed. Fig. 1 shows a type of automatic syphon fitted in it. Fig. 2 is the plan, and Fig. 3 shows a section of the dosing chamber with a "Quinn" valve installed; either of these appliances can be used for discharging the sewage. The most popular size of syphon is a 3-inch one.

It may be asked: "Why not allow the sewage to overflow from the dosing chamber and cut out the cost of these flushing appliances?" Because practical experience has proved that sewage should not flow away continuously from any source, as by so doing the earth surrounding the tank will eventually become soured and will not respond to natural law in purifying sewage; and because there are other germs that have to be given an opportunity to germinate, these can only be cultivated by an intermittent discharge; and this discharge must be arranged as nearly as possible at regular intervals.

The first type of germs to be cultivated are known as "anaerobic bacteria," the second as "aerobic bacteria;" the former do not require air, the latter do. The former generate carbonic acid gas—that is, during cultivation. This carbonic acid gas must be carried off by



ventilation, which is accomplished by constructing the septic tank in the way shown in Fig. 1.

The aerobic bacteria require air or oxygen, and are, therefore, discharged to a point near the surface of the ground. The lower the contact bed is placed the less active will the bacteria be, even though the soil be ever so porous. Figs. 4 and 5 show a typically constructed contact, or sewage disposal bed, which is made up in various ways according to the lay of the ground. Fig. 5 shows that the surface of the ground is almost level, and, therefore, the tile pipe bed must be level or nearly so—not more than one inch in 20 feet of a slope from the discharge. The laterals may be laid as shown or at right angles. The method shown, however, lends itself more easily to filling the laterals. The trunk line may be the same size as the laterals, but of glazed tile pipe. If the trunk line is short with long laterals, the trunk line should be 6 inches, with 4-inch laterals.

Size of Septic Tank

Space does not permit of us giving details of several sizes of septic tanks; but as there is now a good and generally accepted rule to follow, the type and general lay-out shown in Figs. 1 and 2 will meet all ordinary requirements for an average-sized residence occupied by, say, from 4 to 20 persons. The dimensions may be varied in the plan to any size, but the depth of the dosing chamber as well as the cultivating compartment should remain the same. This is required because of the depth of sewage necessary to have the syphon automatically discharge. But if a Quinn valve is installed in the dosing chamber the depth can be increased.

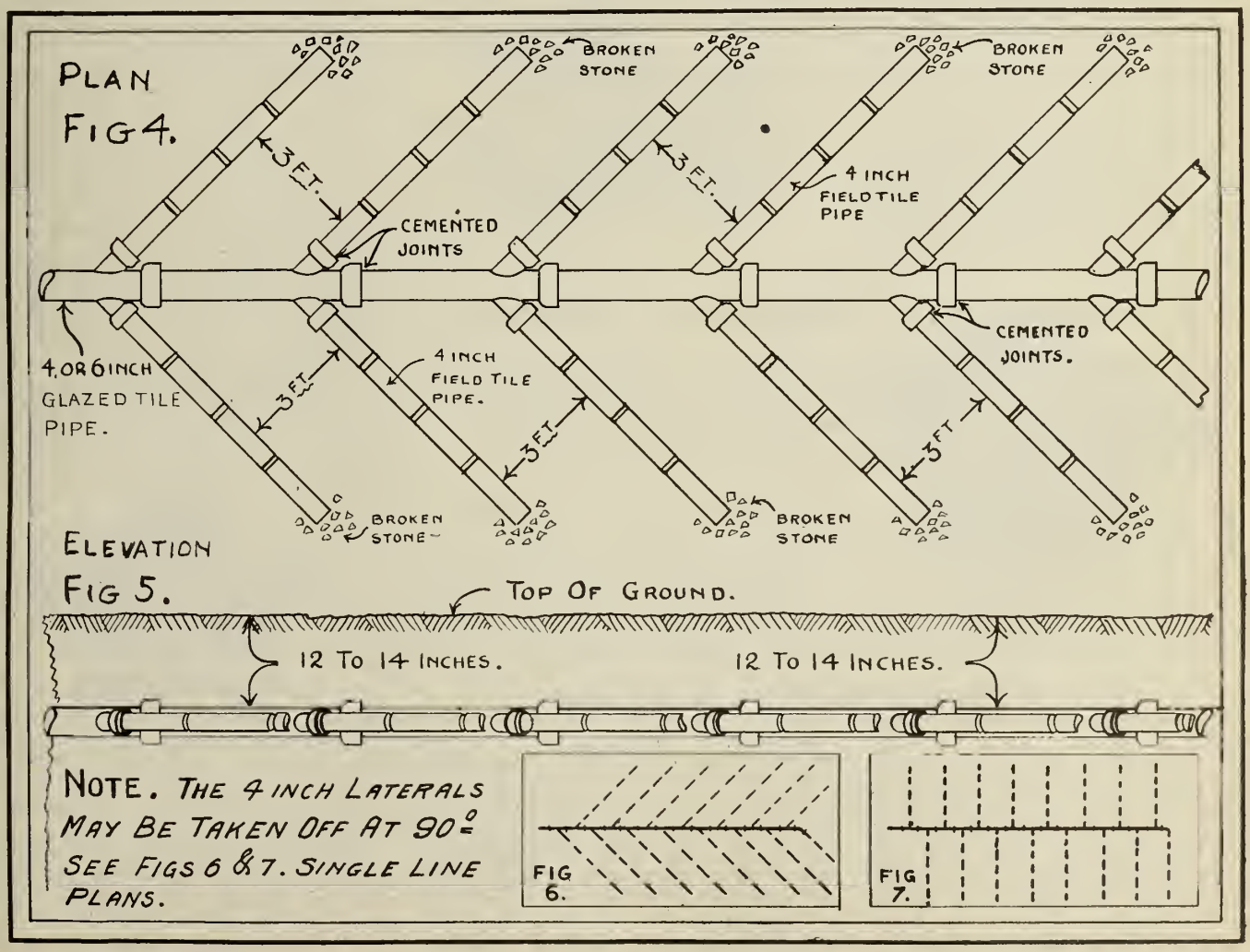
It will be seen that the syphon discharges under a 14-inch head, and that the depth of sewage is 17 inches from the high level to the bottom of the tank. While the dosing chamber in which a Quinn valve is shown contains the same depth of sewage, the whole of the 17 inches of sewage is discharged. Further, if a greater amount of sewage is to be discharged, or rather if a deeper tank is desired, the Quinn valve can be adjusted so as to operate at any depth from 17 to 24 inches. The latter valve may be found very convenient to instal where a tank is already installed, and is found too deep for a 3-inch syphon.

The size of a tank is not, as many persons imagine, determined by the size of a house, or the number of bathrooms in the house, but rather by the number of persons that are to occupy the house; and, further, the size of the cultivating chamber is not of the greatest importance. It is the dosing chamber that is to be carefully considered, viz., the amount of sewage which will be discharged into the sewage bed at each operation. The rule is simple to follow when once the size or type of appliance which is to be used to discharge the sewage has been determined. As an example, turn to Figs. 1 and 2, which size of tank is suitable for a house to be occupied by 6 persons, an allowance of from 18 to 25 gallons, say 21 gallons per person is made, and the contents of the tank shown is 130 gallons; 18½ cubic feet and 1 cubic foot is equal to about 7 gallons. It will be seen, therefore, that the sizes given on the elevation, Fig. 1, can be used for several sizes of tanks by increasing the width in the plan, Fig. 2.

Amount of Tile Pipe Required

Now turn to Figs. 4 and 5. Fig. 4 is the plan, and Fig. 5 shows the elevation. These are merely suggestions, and may be followed out in a general way, the only rule to be followed being that no laterals should be less than 3 feet apart; that the given number of lineal feet must be provided according to rule laid down, and that the trunk line piping have all the joints made tight with oakum and cement putty, while the laterals should be laid with open joints.

If the lay of the ground will not permit of a long trunk line, it would be advisable to use 6-inch vitrified glazed tile, with 4-inch field tile laterals; but if a long line, as shown in Figs. 4 and 5, is to be installed, both sizes may be 4 inch. The trunk line is very seldom taken into calculation as sewage bearing pipe, only the open jointed laterals, so that for



every cubic foot of sewage to be discharged at each operation 13 lineal feet of 4-inch field tile is necessary. In this case, there would be approximately 235 lineal feet required.

Depth of Disposal Bed

It was stated previously in this article that there are two types of bacteria necessary to properly dispose of sewage—one that requires no air, and one that does require air. It is the latter that we must now take into consideration.

First of all, the earth most suitable for a sewage disposal bed should be of sandy loam or gravel; clayey soil is unsuitable, and should be dealt with somewhat differently. With the average porous soil, however, the field tile should not be more than from 12 to 14 inches below the surface, for the simple reason that at such a depth the bacteria will readily perform the duties required; they will procure air of sufficient quantity to assist them to finally purify the sewage which is intermittently discharged into the tile bed.

Most of the micro-organisms of the soil are aerobic, and are found in greatest numbers near the surface, the number decreasing at lower depths until at a depth of 5 feet there are found very few. As an illustration: A certain board of health made a number of tests for bacteria at different depths, and found that at 12 inches over 34,000 germs per gram of soil as against about 4,000 at 5 feet deep. This proved that at from 12 to 14 inches, a depth just below plowing or digging distance, a very desirable quantity of the necessary bacteria are found.

Period and Rate of Discharge

When we speak of an intermittent discharge, we must not forget to take into consideration the period of time between these discharges, and as the size of tank and the number of pipes for a contact bed have been given, it should be explained that the figures given are based upon the best practice; these discharges will take place every 24 hours or thereabouts. The quantity or rate at which the appliances referred to will discharge are as follows:—

The discharge from a 3-inch syphon—that size being the most suitable—is about 80 to 90 gallons per minute, or about two barrels, and is put into operation in the following manner: When the syphon and tank are ready, about two gallons of water should be poured into the syphon before the bell is put into place. Now put on the bell and see that it rests firmly and is level; then pour a little water into the small trap at side of bell, and the syphon is ready for operation.

With the Quinn valve it is simply a case of moulding a 4-inch standard or medium quarter soil pipe bend into the bottom of the tank, then placing the valve into position, and caulking it in with oakum and molten lead, just as is done when making a regular soil pipe joint.

The quantity of discharge when a Quinn valve is used depends upon the depth of sewage.

While this article simply describes a simple design of septic tank and sewage disposal system, suitable for ordinary use, there are a number of conditions that require special instruction. These will be dealt with in future articles to appear at later dates in SANITARY ENGINEER.

In the meantime, if any of our readers desire specific information regarding sewage disposal systems, we will be only too pleased to take up such matters in this connection as may be desired.

(To be continued.)

How to Prevent Atmospheric Pollution

Heating Engineers Would Become Public Benefactors if They Would Insist on Installing the Very Latest Heating Appliances Only, Thus Conserving Our Coal Supply and Safeguarding the Health of People.

HOW receptive we all have become since the Great War commenced. In many cases, it has brought us back from dreamland to realities, compelled us to take notice of much national waste which previously was unperceived by all except a few keen students and workers. Take the case of Atmospheric Pollution. What an enormous waste regularly goes on by the consumption of raw coal, and how this waste contaminates the air we breathe in our cities and adversely affects the health of the people and the life of our buildings, some of them of priceless value. Quite recently there has been published the First Report of the Committee for the Investigation of Atmospheric Pollution appointed at the International Exhibition and Conference in London in 1912. It is a most interesting report.

The pollution can be divided into two classes—solid and vaporous and gaseous—and a few extracts from the Report concerning them will convince everyone of the necessity of some action being promptly taken to get rid of the evil.

Solid Pollution

The atmosphere as we know it from everyday experience, contains suspended solid matter which cannot be regarded as a normal part of its constitution. Its significance from the physiological point of view is realised when we remember that an adult human being inhales about 400 cubic feet of air per day. No doubt a large proportion of this suspended matter is arrested in the filtering mechanism of the respiratory organs, but investigation has shown that suspended matter of a gritty nature will sometimes bring about bronchial inflammation.

Much of the solid pollution consists of combustible sooty matter, and those who have had occasion to handle shrubs, trees, and other plants in or near towns are familiar with the sooty stains that are left on the hands. This constituent is the source of much trouble in towns, where it gives a distasteful murky appearance to works of art, delicate fabrics, buildings, etc. Mural paintings are frequently found seriously obscured by a deposit which has its origin in the pollution suspended in the air.

A series of tests were made to ascertain the quantity of the atmospheric impurities and they were collected in standardised gauges placed on the ground level in open spaces free from abnormal dust and everything falling on the gauge was carefully preserved, tested and weighed.

The results recorded are astonishing. In the twelve months ending March, 1915, in Exeter, the quantity of solids, soot, tar, ash, etc., which fell, works out at over 106 metric tons per square kilometre. In Birmingham it was 255 tons; London Meteorological Office 142 tons; London Embankment Gardens 214 tons; Newcastle-on-Tyne 186 tons; York 108 tons.

Vaporous and Gaseous Pollution

The vapours to which the attention of the Committee has been given were the tarry hydrocarbons. This tarry matter attaches itself to the carbon particles and gives them very great adhesive power so that when they have deposited on and attached themselves to building stones, plants, etc., they cannot be readily washed away by rain, as would be the case if the tar were not there.

The gaseous pollutions kept in mind by the Committee were the sulphur oxides and ammonia. Coal contains on the average, about 1 per cent. of its weight of sulphur (say 20 to 30 lb. for each ton of coal). Under conditions of perfect combustion this sulphur would be evolved as either di-oxide or tri-oxide of sulphur or both, but it is probably always safe to assume that when visible smoke is evolved from coal sulphuretted hydrogen accompanies it.

Waste

This waste and pollution should not be allowed to go on. Those very products which contaminate the atmosphere, if properly preserved, are valuable for making explosives, dyes, and numerous other necessities.

The burning of coal should be very carefully considered these days, when the hauling is such a serious matter. Then, burning it only in part, as shown in this article is not only a wanton waste, but is injurious to the health of the people.

We have all manner of heating appliances that conserve coal such as magzine fed furnces. Oil burning appliances, gas heated furnaces etc.

(Continued on page 31)

Steam Traps, and How They Operate

Heating Engineers Will be Interested in This Series of Articles Which, After Describing Some of the Most Effective Radiator Traps, and the Tilt Trap, Will Deal With the Condensation Return Trap, Etc.

STEAM TRAPS—III.

THE great majority of steam traps are more or less dependent on one particular principle as a basis for their operation, each arrangement being designed to accomplish one or more specific purpose—thus, one trap may have

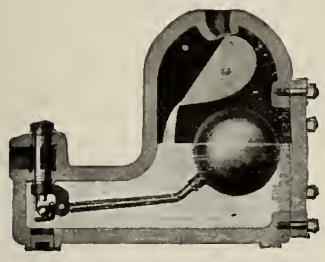


FIG. 12.—NASON-VESUVIUS STEAM TRAP WITH FLOAT ACTUATED BALL VALVE AND TILTING BUCKET

an inherently large bore of valve seat, another may be suitable for a wide range of pressures, and another may be so constructed as to avoid any possibility of air binding, while in addition to the foregoing, accessibility for repair and ease of replacement are additional features striven after by others.

Nason-Vesuvius Steam Trap

In this trap every effort has been made to embody such features as are desirable or necessary to satisfactory service, while a novel device is provided to insure freedom of flow and certainty of valve action. The Nason-Vesuvius trap is of the intermittent discharge, float control type, having a regrinding ball valve which is either full open or

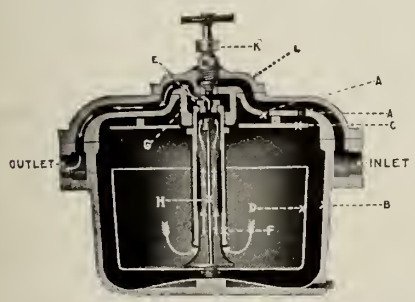


FIG. 13.—NASON STEAM TRAP SHOWING BY-PASS VALVE AND OPERATING BUCKET.

closed, and also a self-tipping bucket designed to facilitate the controlling action of the float. The interior of the trap is shown in Fig. 12, which illustrates the principal features of construction.

When the trap is being installed, it is placed at the lowest point to be drained, connection being made at the inlet, while the outlet, which is closed by a ball valve, is piped in any convenient manner. The incoming water is received in a copper tilting bucket, which is so balanced that it tips over when filled, the contained water falling into the main body of water below. The action of this falling water imparts a quick upward impulse to the float, which pulls the ball downward from its seat, allowing a clear free way for the discharge. The contents are now discharged until the receding water level allows the float to drop, thus raising the ball valve back towards its seat, until a predetermined level is reached when the flow of the discharge picks up the ball and instantly seats it, thus closing the orifice until

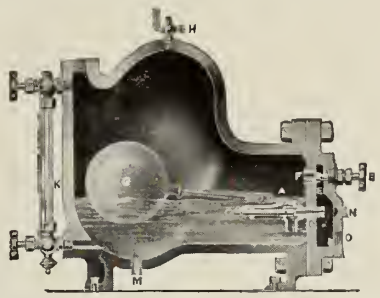


FIG. 14.—AMERICAN IDEAL TRAP WITH FULL BORE VALVE.

such time as additional drain water causes the operation to be repeated.

Normally, this trap is of the intermittent type, but, under overload conditions, the discharge becomes continuous until the excess of condensation is removed, when its normal intermittent operation is resumed. It possesses the one advantage of a continuous discharge trap in its ability to take care of excess condensation, and none of its disadvantages, for the reason that the valve is either fully open, or tightly closed, thereby preventing scoring of the valve seat. A feature that greatly prolongs the life of the seating surfaces is the peculiar action of the ball valve construction, which results in a different portion of the ball surface being presented to the seat at each closure. The fall of water from the tilting bucket keeps in motion any particles of scale or foreign matter, so that they do not settle, but are discharged with the water, which seals the valve at all times.

This trap is built by the Nason Mfg. Co., New York, in three classes, suitable for pressures from 1 to 50, 50 to 150, and 150 to 250 lbs. per sq. in. Four sizes in each class are made, with pipe connections from ¾ in. to 2 in. Examination or repair is easily accomplished without disturbing the pipe line connections; by removing the cover and loosening the valve plug the working parts are instantly removed from the body.

Nason Steam Traps

A trap of the bucket type is made by the above mentioned firm, and is adapted for pressures from 1 to 20, 20 to 70, and 40 to 150 lbs. per sq. in. The type of construction common to each is shown in Fig. 13. A cast iron reservoir or pot B, closed with a cover G provided with two cored passages, contains an open float D, which is fitted with a ribbed spindle H for its guidance. A housing or sleeve F is screwed centrally into the under side of the cover G, and within it the spindle H slides smoothly, permitting a short vertical motion. The top of the spindle is ground flat, and its upward movement is arrested by coming in contact with the bronze plug E, having a central opening, the two surfaces thus constituting a discharge valve for these traps. One of the cored passages in the cover alluded to is for the discharge of water from the trap after passing

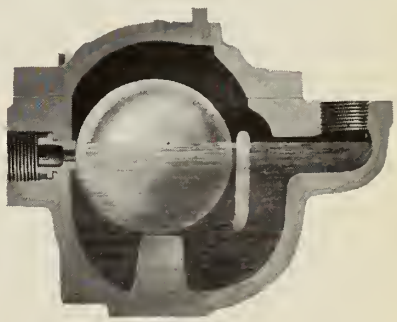


FIG. 15. — SECTIONAL VIEW OF THE JOHNS-MANVILLE STEAM TRAP SHOWING CONTROL BALL AND VALVE SEAT

through the valve E, and the other serves as a by-pass, to permit any large volume of air or water to be blown through, when starting, without going through the discharge valve. Valve K gives entire control of this action.

The trap being so placed that the water of condensation flows into it by gravity, the discharge enters at the point marked "Inlet" and passing through the cored openings AA into the body of

the trap B, a diaphragm C above the float D diverts the water of condensation into the pot or body of the trap B, where, gradually rising, it raises the float D, thereby closing the discharge valve E.

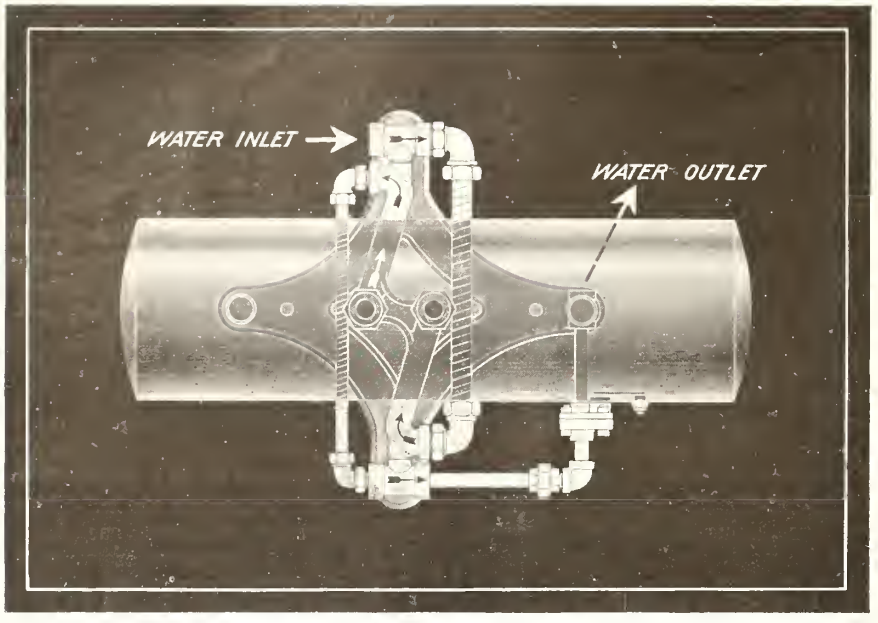


FIG. 16.—FARNSWORTH NON RETURN SEPARATING TRAP.

Valve K being closed, discharge from the trap is shut off and remains so until the float D becomes nearly filled from the overflow of water into it, when its weight becomes such that it overcomes the tendency of the discharge valve E to remain closed, being held there by steam pressure, and it drops to the bottom, thereby opening the discharge valve E. Acting on the surface of the water, the steam pressure immediately drives it up through the sleeve F (as indicated by arrows), through the discharge valve E, and thence by way of the cored passage to the "Outlet."

When the float D has been nearly emptied it becomes so light that it is again raised by the water surrounding it, thus closing the discharge valve E, and the operation is repeated. The weight of the float D is such that a permanent water seal always remains over the point of discharge into the sleeve F, thus preventing escape of live steam where the discharge valve E is open.

From the above description it will be observed that the valve action is purposely intermittent, which necessitates that it shall be either wide open or completely closed, an advantage which entirely obviates any tendency to wire-drawing. The life of the valve is thus definitely prolonged and danger of leakage at this point reduced to a minimum.

American Ideal Steam Trap

This trap is of the float-controlled, water-sealed, full-bore valve type, the controlling float operating the valve through a powerful toggle mechanism, as shown in Fig. 14. Sediment blow-off, air cock and water gauge are provided, also a by-pass valve connecting the interior of the trap with the outlet connection. Six sizes are built by the American Steam Gauge and Valve Mfg. Co., Boston, the pipe connections ranging from ⅜ in. to 1½ in., and the capacity of water in lbs. per hour at 100 lbs. pressure, from 2,756 to 42,700.

Johns-Manville Trap

As an example of extreme simplicity, this trap is interesting. It comprises a body, rolling ball, and discharge bushing, and the ball is the only movable part of the complete device. The non-attached rolling ball is subjected to a pressure equal at all points except that area resting against the discharge orifice. When condensation enters the trap through the inlet (see cross section, Fig. 15), the ball rolls up, exposing the discharge opening, which permits a discharge of water and air without any loss of steam.

A feature of the trap is its inability to air-bind, because the air, being heavier than steam and lighter than water, forms a film on the surface of the water and is carried out with it. While the condensation acts as a lifting force, which is responsible for the outlet being uncovered, allowing the escape of water, air, and other gases, the steam pressure simultaneously forces the ball to seat itself against the upper part of the opening with sufficient pressure to prevent any possible discharge of steam The ball readjusts itself to its seat automatically every time the trap discharges, and is thus kept clean. The H. W. Johns-Manville Co., New York, are the makers of this trap.

Earnsworth Tilting Traps

A series of tilting traps adapted for a variety of service is shown in Figs. 16 to 19. These are the product of the Farnsworth Mfg. Co., Boston, and are marketed by the Canadian Fairbanks-Morse Co. Various types of the Farnsworth tilting trap are shown in Figs. 16 to 18, while a duplex boiler feeder is shown in Fig. 19.

The principal features of this trap are the substitution of knife-edge trunnions in place of packed trunnions, the incorporation of Everlasting blow-off valves as a standard component of the apparatus, with positive valve control, entire control of operation by the condensation, and a complete absence of packing or lubrication. The tanks used are of welded construction and suited

(Continued on page 26)

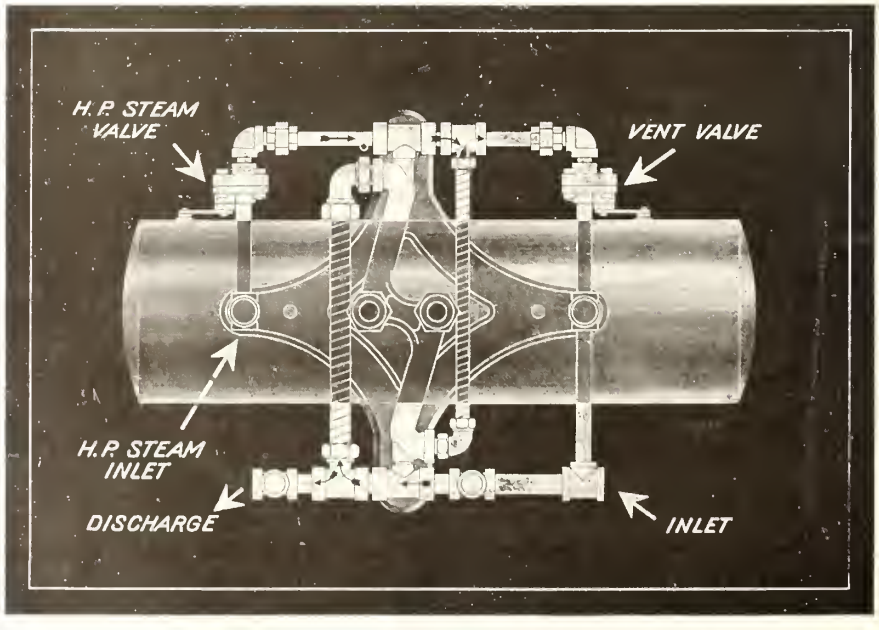


FIG. 17.—FARNSWORTH LIFTING OR PUMPING TRAP.



OUR FIRST PUBLIC EXHIBIT

ONE of the very first planks in our business program to decide upon, when acquiring the control of the late Standard Ideal Co., was that of service.

This policy is being rigidly carried out, and with that in view, we went to considerable expense in having our products on exhibit at the Annual Toronto Exhibition.

The public were given an idea of the quality manufactured by us, and could not fail to have been favorably impressed. Granting this, we feel that the plumbing trade, as well as the public, will have derived much good from our efforts.

The plumbing trade are asked to respond by specifying Port Hope Enamelware on their next order. It cannot be excelled in quality; if it could we would see to it.

Complaints are courted from our customers whenever they present themselves. We are out to please our customers first, last and always.

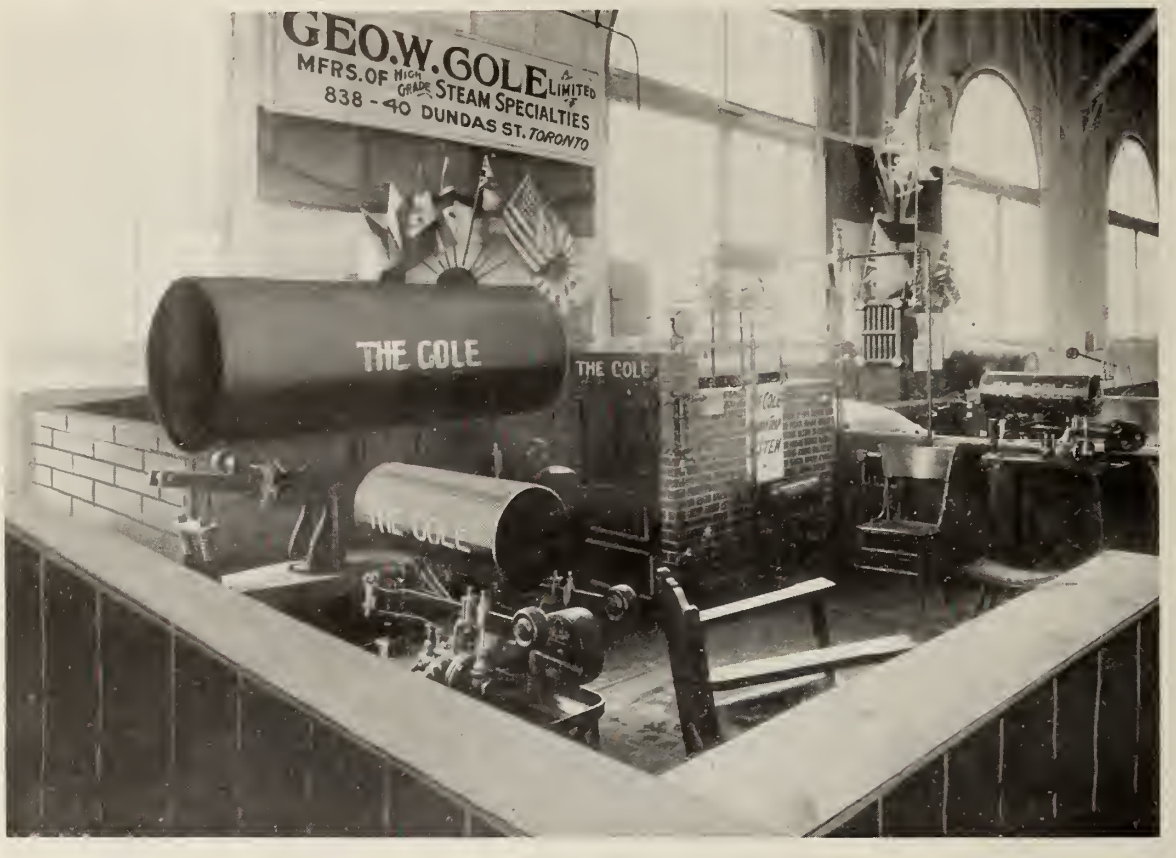
TORONTO SHOW ROOMS
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MONTREAL SHOWROOMS
234 Beaver Hall Hill

Port Hope Sanitary Mfg. Co., Limited

Factory:
PORT HOPE, ONTARIO

Head Office:
ROYAL BANK BUILDING, TORONTO



"CASH YOUR CONDENSATION"

Is timely advice these days, and we not only demonstrated at our exhibit recently how this can be done but gave scores of names where our appliances have saved one-third the fuel consumption and doing it every day, where steam is used steadily.

The point is, Mr. Heating Engineer, that where steam heating installations are not giving the service they should, nine times out of ten, the trouble is caused by air or water in the system.

Both can be properly and scientifically handled by the use of Cole traps.

We are expert condensation engineers, first, last and always. We specialize in creating a greater efficiency in steam heating plants, whether high, low or exhaust steam is used for heating of any kind.

We can return every drop of condensation back to the boiler at a higher temperature than any pump that ever existed for that purpose.

Cole traps have features embodied in them that put them in a class by themselves, are all thoroughly tested and tried under actual working conditions before they leave our factory.

Have you procured one of our books on Condensation? Write for one while they last. They're Free.

GEO. W. COLE CO., LIMITED CONDENSATION ENGINEERS

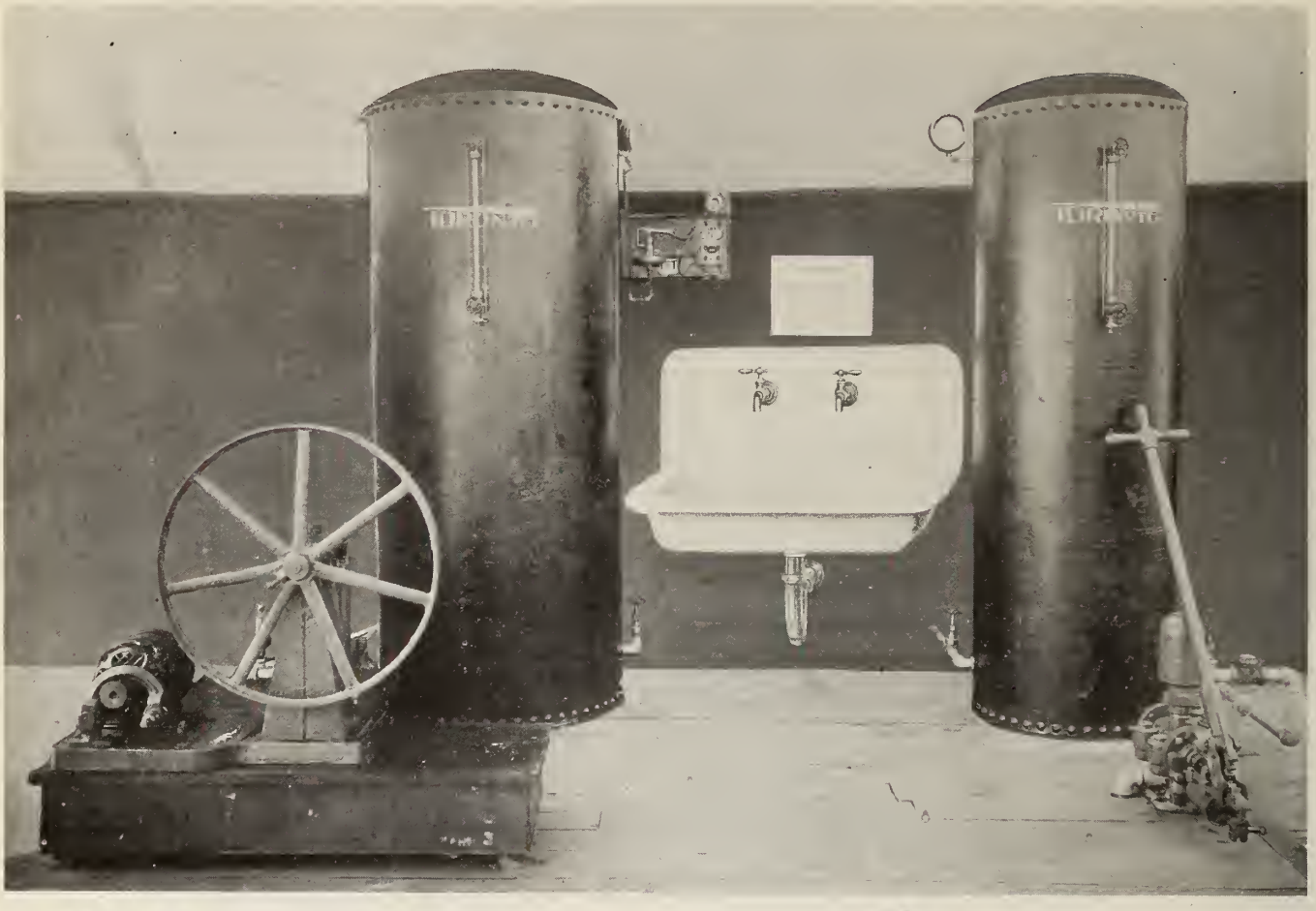
838 Dundas Street, Toronto, Canada



A SPECIAL feature of the James Robertson Company's exhibit this year was the Continuous Flowing Hospital Bath with its canvas cradle, also the Wall Basin for a doctor's office, which showed a new pattern of Knee Action Control for Supply and Waste. The Nickel-Plated Brass Fittings shown in the entire exhibit were from the Company's work-rooms and of the standard high grade which James Robertson Company has for long been noted.

Another display to which the attention of Farmers and City People, who have country homes, was called, was the showing of Electric and Hand Pumps with Pressure Tank, Kitchen Range Boiler and the new Perfection Coal-oil Heater, for use where there is no gas; also sink, laundry tray and a three-piece bathroom outfit to complete an installation in those parts of the country, not only where Hydro power is available, but also where gasoline or hand systems only can be used. This display was carefully examined and discussed by the many interested parties who were attracted by the conspicuous sign reading, "ROBERTSON'S CITY CONVENIENCES FOR FARMERS' COUNTRY HOMES."

THE JAMES ROBERTSON CO., LIMITED



Mr. Sanitary Engineer

ONTARIO WIND ENGINE & PUMP CO. LIMITED
TORONTO

PNEUMATIC WATER SYSTEMS

were examined by visitors at the Exhibition this year, with a great deal more interest than ever before.

Farmers and rural residents are looking forward to the time when they will install sanitary appliances in their home. They are becoming more educated every day and realizing more and more how necessary such appliances are becoming.

A few years ago the average farmer looked upon a pneumatic water system with no small amount of suspicion and distrust, because he was not quite conversant with the workings of such systems. But to-day he is a buyer. He is the best prospective buyer in the Dominion, he only needs canvassing. Harvests have been good and prices are fair. The farmer was never in a better position than he is to-day.

If you want to know more about our systems, drop us a line.

Toronto Pneumatic Water Systems cannot be beaten, and the prices are right.

ONTARIO WIND ENGINE & PUMP CO., Limited

MONTREAL TORONTO REGINA



A few of the main buildings in Exhibition Grounds.

Canadian National Exhibition

Great Progress in Evidence in all Lines of Sanitary and Heating Engineering Appliances—A Mass of Splendid Exhibits Shown by Manufacturers and Supply Men, One of the Best Treats For Many Years.

EVERY year brings with it all manner of improvements in sanitary and heating appliances, and the year 1916-17 was no exception to the rule. This was proved at the recent Toronto Exhibition.

In the sanitary appliances there were improved pumping appliances on exhibit, improved cast iron enamelled traps of various styles, new types of baths, lavatory bowls as well as W.C. combinations and improved seats.

If we could go back a few years and place ourselves in the position of trying to forecast some of the new lines that might be invented, we never could have expected to see the improvements that are on our hands to-day.

Just imagine for a few moments the improvements in heating appliances that have taken form since the last Exhibition one year ago.

Of course there are many inventions which have fallen by the wayside, and have not measured up to one's expectations, but we succeed by our mistakes and those of our fellowmen. There are however, fewer mistakes made as time goes on, but as one great writer, now gone to the Great Beyond said: "The man who never made a mistake, never made anything." So we learn by our mistakes, they are the real telling germ of our experiences.

But in spite of all the short-comings, progress in scores of lines was in evidence at the Exhibition. Gas water heaters of many types were in evidence. Gas fired steam boilers and hot water furnaces were on exhibit, several types of heat controlling devices, fuel saving appliances and new tools of all kinds.

Besides all these, there have been scores of improvements that we have not shown at the Exhibition, such as new improved w.c. valves, new w.c. seats, new types of water systems, pneumatic and otherwise; small lighting systems, both electric and gas. One of the greatest improvements in small electric lighting systems is that of one which dispenses with the cumbersome and expensive shortage battery. Some of the greatest electric experts of our days would have asserted very firmly that to make an electric lighting system for a residence without the use of a set of storage batteries would be an impossibility. But it has been done, and to-day such an appliance is available, and we are told that the cost of upkeep is much less than the cost of electricity in many of our Canadian cities.

Farmers can enjoy every city comfort without any exceptions these days, thanks to the dreamers of the day. It not only remains for the sanitary and heating trade to bestir itself and put these appliances in every farm home, the farmer was never so well off. He is buying automobiles by the thousands and is not aware of the sanitary and heating appliances at his disposal.

Just by way of giving our readers an idea of the way the manufacturers of sanitary and heating goods appreciate the Toronto Exhibition, with the opportunity it gives them of meeting their many customers, as well as in an endeavor to show to the public what is being done to make this world a better place to live in, we will give a list of lines that were on exhibit this year, and in many cases there were a great variety of the one line of goods:

Cast iron enamelware, including:

Bath tubs.
shower receptors.
Drinking fountains.
Kitchen sinks.
Slop sinks.
Laundry trays.
Sink and lavatory traps.
Hospital baths.
Pedestal lavatories.
W.C. bowls.
Bath room utensils, urinal fixtures and stalls.

Brass Goods

W.C. valves.
Bath cocks and combinations.
Sink cocks.
Mixing valves for showers.
Mixing valves for lavatories.
Bath waste and overflow fixtures.
All manner of patent ground key work.
Copper floats, "no sol."
A large variety of drinking fountains and a score of other brass lines used in the sanitary business.

Heating Appliances

Gas fired furnaces both for hot water, hot air and vapor steam, all controlled automatically.

Copper coil gas water heaters, instantaneous and otherwise.

Cast iron sectional gas water heaters.

Gas fires of various types.

Water heaters for use with a range boiler in which oil can be used for fuel.

Steam traps for radiators as well as return traps.

Pneumatic Water Systems

A variety of hand driven systems. Electrically driven as well as windmill and gasoline engine pumps.

Great improvements have been made on these appliances recently, both in capacity and general efficiency, noise being almost eliminated, which is a great factor when we consider that most of such apparatus requires to be installed in one's home, and is liable to be automatically set in motion in the dead of night. In fact the number of exhibitors of sanitary and heating goods of all kinds such as are installed by those of our craft, amounted to about 40, a splendid showing in comparison to other industrial lines, and when we consider the value to humanity, that these exhibits represent, we very much doubt if there is one industry that is as essential to humanity as that of the manufacture of sanitary and heating engineering goods.

New Canadian Patents

No. 176,514.

The Fess Oil Burners of Canada, Limited, Toronto, Ontario, Canada, assignee of The Fess System Company, San Francisco, California, U.S.A., assignee of Milton A. Fesler, 17th April 1917; 12 years. Filed 19th December, 1916. Receipt No. 273,380.

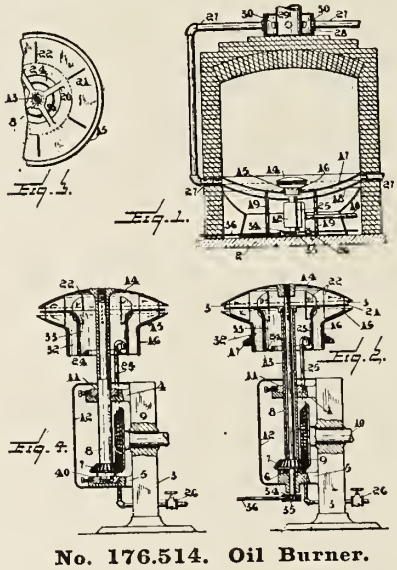
Note.—This patent is a reissure of No. 132,068, dated 14th April, 1911.

Claim.—1. In an oil burner, the combination of two concentric plates having an air space between them and set with their outer edges in close proximity, a positively driven rotating device located between the plates adapted to discharge oil from its outer edge in a thin annuler sheet between the outer edges of the plates, means located centrally of the apparatus for delivering air to the space below the upper plate and above the lower plate, and centrally located means for supply oil to the oil discharging device.

2. In an oil burner, the combination of two concentric plates having an air space between them and set with their outer edges in close proximity, a positively driven rotating device located between the plates provided with an outwardly extending rim adjacent the edges of the plates and a surface extending more or less axially of the device over which oil must flow to reach the rim, means located centrally of the apparatus for delivering air to the space below the upper plate and above the lower plate, and centrally located means for supplying oil to the oil discharging device.

3. In an oil burner, the combination of two concentric plates having an air space between them and set with their outer edges in close proximity, a positively driven rotating device located between the plates adapted to discharge oil from its outer edge in a thin annular sheet between the outer edges of the plates, means located centrally of the apparatus for delivering air to the space below the upper plate and above the lower plate, centrally located means for supplying oil to the oil discharging device and vanes adapted to be rotated to discharge air outwardly above and below the oil discharging device.

4. In an oil burner, the combination of two circular plates having an air space between them and set with their outer edges in close proximity, a positively driven rotating device located between the plates adapted to discharge oil from its outer edge in a thin annular sheet between the outer edges of the plates, means located centrally of the apparatus for delivering air to the space below the upper plate and above the lower plate, and centrally located means for supplying oil to



No. 176.514. Oil Burner.

the oil discharging device, a break open to the air being provided between the oil supplying means and the oil discharging device whereby the effects of irregularities of flow are cushioned.

5. In an oil burner, the combination of two circular plates having an air space between them and set with their outer edges in close proximity, a positively driven rotating device located between the plates provided with an outwardly extending rim adjacent the edges of the plates and a surface extending more or less axially of the device over which oil must flow to reach the rim, means located centrally of the apparatus for delivering air to the space below the upper plate and above the lower plate, and oil supplying means centrally located and adapted to deliver oil to such axially directed surface.

6. In an oil burner, the combination of two circular plates having an air space between them and set with their outer edges in close proximity, a positively driven rotating device located between the plates provided with an outwardly extending rim adjacent the edges of the plates and a surface extending more or less axially of the device over which oil must flow to reach the rim and an annular channel at the lower end of said surface, means located centrally of the apparatus for delivering air to the space below the upper plate and above the lower plate, and oil supplying means adapted to deliver oil in such a manner as to reach said annular channel.

7. In an oil burner, the combination of two circular plates having an air space between them and set with their outer edges in close proximity, a positively driven rotating device located between the plates provided with an outwardly extending rim adjacent the edges of the plates and a surface extending more or less axially of the device over which oil must flow to reach the rim, means located centrally of the apparatus for delivering air to the space below the upper plate and above the lower plate, oil supplying means centrally located and adapted to deliver oil to such longitudinally directed surface, and vanes adapted to be rotated to discharge air outwardly above and below the oil discharging device.

No. 174,281.

John S. Light, Tuscaloosa, Alabama, U. S.A., 2nd January, 1917; 6 years. Filed 2nd April, 1916. Receipt No. 270,400.

Claim.—1. A wrench comprising a fixed jaw, a shank integral with the fixed jaw and extending from the back thereof and having a tapered rear edge and also having an enlargement at the end of the taper and further having teeth at it forward edge, a spring plate integral with the enlargement of the shank and arranged in spaced and parallel relation to the shank, a body slidable and moveable on the shank and having teeth opposed to those of the shank and also having side walls and a transverse intermediate wall, the latter arranged at the opposite side of the spring plate, with reference to the shank, a movable jaw opposed to the fixed jaw and having a shank fu'crumed at an intermediate point of its

(Continued on page 30.)

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COME OUT INTO THE OPEN

SANITARY and heating engineers, your reputation is at stake, you are apparently at the beck and call of sub-contractors and impractical men, you are being fooled into installing material that has been proved unfit for the purpose it is being called upon to fulfil, and it is your money that is paying for it.

Come out into the open, refuse to be the tool of every impractical man who has the brazenness to pretend to teach you your trade, a trade that stands alone almost, which requires not only practical, but long and hard experience to make one competent.

Why should Peter Lyall take 10 per cent. from your labors, and know so little about your business? Why should so-called experts specify wrought iron pipe (extra heavy) and galvanized at that, for soil and waste pipes, when it has been proved by the ablest men in the trade to be unfit for such a purpose?

Sanitary engineers, come out into the open and assert your practical experience, you will gain the lasting respect of the Canadian people by so doing.

You will save the Canadian people millions of dollars in a very few years if you refuse to have incompetent men placed over you, who demand that you assist in installing material which costs more and is worth considerably less as soil and waste pipes than material far better fitted for the purpose.

Some years ago Ottawa was visited with a couple of typhoid epidemics, caused by water pollution. Now the Parliament Buildings are to be equipped with piping that in a few years will be full of holes, and will allow the atmosphere in those buildings to become polluted, leaks will supervene and floors and ceilings will become flooded with sewage.

Are you going to stand calmly by and see such an iniquity perpetrated without a protest?

CHARACTER-MAKING A NATIONAL NEED

THE war still wages, success for first one side and then the other. With an overwhelming majority of the world's population on the side of right, on the side of freedom and liberty. What does all this mean, is there not a deeper meaning than crushing the enemy of liberty? Are not those that are fighting Prussian Militarism also finding themselves? finding out that they themselves are becoming better men, that to-day there is more true fellowship among men than ever since the world began. Just look into the methods being adopted in business on all hands. Examine the people's thoughts and feelings regarding the way business has been conducted for many years. The law of supply and demand is fast dying. Why? because we are finding ourselves, we are beginning to realize that the law of supply and demand is rotten, has caused untold misery, and is in fact responsible for this war as sure as that the sun rises in the east and sets in the west. It is the duty of every human being to think more, to learn more, to better fit oneself to become better citizens of this fair land. The following quotation from a sermon preached by the Rev. Dr. Ribourg in St. Alban's Church, Toronto, Sept. 2, is well worth reading over. It breaths new life, new hopes, and new aims that should, and no doubt will, be given some serious thought.

The sermon was the "Labor Day" sermon and his subject "The Transfiguration of Man." Dr. Ribourg said that the development of material resources by capital and labor should not be an impediment to the production of noble characters.

"The only way to make the country clean and pure is to make clean and pure citizens. Material resources must be developed to the fullest extent for the benefit of the community, but they will be truly beneficial only as they are used for the best, noblest, and highest motives, that is in helping to produce the highest type of manhood and citizenship.

"Character in citizenship is the only legacy worthy to be bequeathed to posterity. The whole political, social and educational machinery of the country must be directed to that end, even if this requires many radical and fundamental changes in our methods, whether in the state or in the church.

"As it is, class faces class in sullen distrust. Men have learned to make wealth much faster than they have learned to distribute it justly. Their eye for profit was keener than their ear for the voice of God and humanity. That has been and is still the great sin of modern society, and unless we repent we shall perish by that sin. A very far-reaching and profound re-study of the lines on which our economic and industrial life is to be rebuilt after the war is an imperious necessity. This may mean an industrial revolution, but revolution let it be if it is to bring about a better type of manhood in the world."

Sanitary and heating engineers are of all trades least smirched with things of a destructive nature. The craft's labors are dedicated to the law of cleanliness, sanitation and the all needful improvements which make life worth living, and we should be proud of our calling, proud to be thus occupied in making whatever corner of the earth man resides a better place to live in.

STEAM TRAPS AND HOW THEY OPERATE

(Continued from page 18)

for a working pressure of 125 lbs. per sq. in. By providing knife edges on which to oscillate, the trouble due to

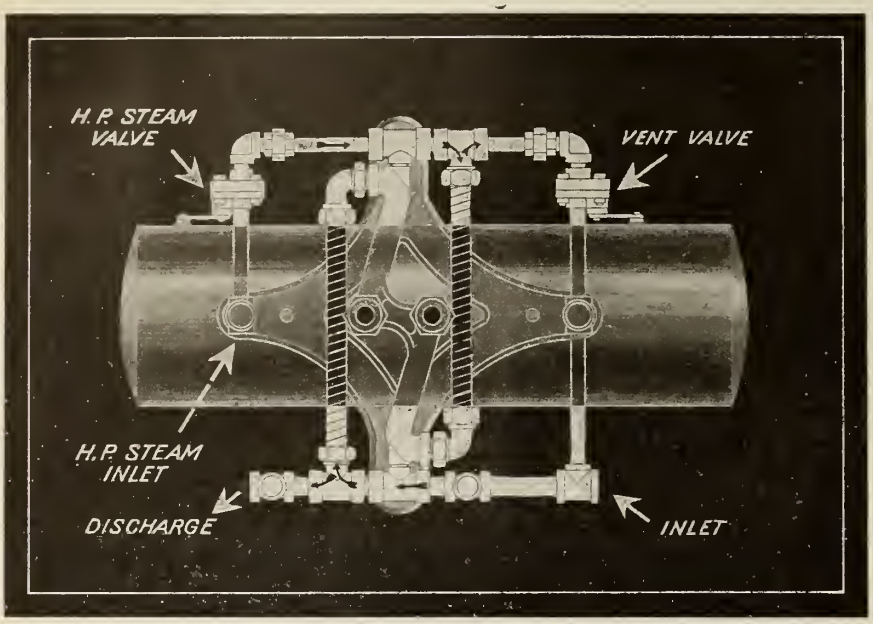


FIG. 18.—FARNSWORTH DIRECT RETURN TRAP.

binding and leaking of packed trunnions are eliminated, while the oscillation of the tank is utilized as a positive means of operating the blow-off valve.

When starting the trap, the short end is held down to allow the tank to be filled by condensation—once being sufficient for any length of service. On being released, the long end tilts down, opening the outlet valve and allowing the trap to discharge until the long end is drained through a diagonal pipe into the short end, thence out through the discharge valve. The tank then oscillates, the short end tilting down, closing the outlet valve and allowing condensation to again accumulate in the long end. This procedure continues until the pipe line is completely drained, the steam being water-sealed and not allowed to escape during the operation of the apparatus.

By an ingenious arrangement of additional valves, it is possible to produce various styles of traps, all of which employ the positive valve control. Fig. 16 shows a non-return separating trap which receives condensation under high or low pressure and delivers it approximately two feet upward for every pound pressure on the line being drained; this type of trap does not return the water to the boiler.

A lifting or pumping trap is shown in Fig. 17, which receives low pressure condensation and lifts or pumps it to any point of use (except into the boiler) by the admission of high pressure steam at the moment of discharge. This type may be used with economy as a steam pump for handling any liquids, and may be operated in a submerged condition as a bilge pump.

When it is required to deliver condensation directly into the boiler at higher temperatures than possible with a steam pump, the direct return trap, Fig. 18, may be used. This trap receives condensation at high or low pressure and automatically returns it to the boiler with a lower steam consumption than that of a pump, economy being effected by conserving the heat lost through pressure reduction and temperature radiation in other methods of boiler feeding.

An interior view of the Farnsworth duplex boiler feeder from the water side is shown in Fig. 19. This apparatus confines into one the hot well, air

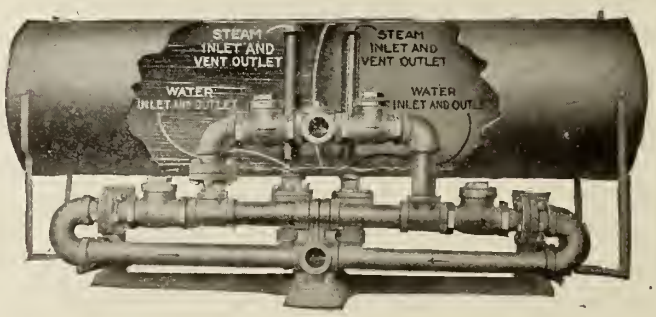


FIG. 19.—FARNSWORTH DUPLEX BOILER FEEDER, WATER SIDE.

pump, vacuum devices, heater and boiler feed pumps. It is adapted for use with pressure and vacuum heating, and in the case of the latter creates and maintains the vacuum. Its construction is similar to the tilting traps, the tank oscillating on knife-edges and having the same valve operation, being, in fact, a duplex direct return trap. The tank is so made and adjusted that one side is always receiving while the other is always delivering directly into the boiler, resulting in continuous circulation and preventing the system becoming waterlogged.

MATERIAL USED IN ONE OF UNCLE SAM'S NEW MILITARY CAMPS

Brief Figures That Tell the Marvelous Story of Its Magnitude

Camp Grant is one of the sixteen big cantonments of the government, in each of which 35,000 to 45,000 men of the new National Army will be trained.

It embraces 3,000 acres alongside of the beautiful Rock river.

One thousand, one hundred and forty-three buildings are now being erected by six thousand workers.

One hundred and eighty barracks will house 36,000 men (200 men each).

The hospital unit, accommodating 1,000 sick, will comprise 61 buildings and will cost, exclusive of equipment, more than half a million dollars. Provision will be made for enlargement of capacity to 1,500 beds.

The National Y.M.C.A. will erect eight buildings, the auditorium seating 3,500.

The Red Cross will occupy two buildings.

The Knights of Columbus will also erect a large recreation hall.

Two thousand officers will locate outside the camp.

Ten thousand horses and mules will be part of the equipment.

The parade ground will be 1,000 feet wide and one mile long.

The rifle range will contain 500 acres.

What It Takes to Build a Soldier City

Forty million feet of lumber.

One thousand tons of nails.

One hundred and fifty acres of felt roofing.

One hundred and seventy carloads of plumbing.

Fifty miles of water and sewer pipe.

permanent macadam and gravel roads.

Two hundred and fifty miles of electric light wire.

The heating plants will cost over a million dollars.

A 300,000 gallon cement reservoir.

A large ice-making and cold storage plant.

Twelve artesian wells: 4,000 gallons per minute.

About 1,101,200 lbs. of flour, 210,000 lbs. sugar, 157,500 lbs. of bacon, 15,000 cans of beef, 78,000 lbs. of beans, 36,000 cans of salmon, will be required each month to feed the 36,000 troops.

The monthly pay roll will be about a million and a half dollars.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE.

OF PRIME interest to the plumbing trade in the way of price movements during the time intervening since last issue, has been the decline in the price of lead pipe and lead waste pipe. Wiping solder and lead wool have also had a downward swing. Old heavy zinc has declined while old heavy copper has been in slightly firmer market with an advance of half a cent. Galvanized sheets again give evidence of being moved from the low quotations owing to a recent ruling of the customs department with respect to the payment of duty which affects the price at which dealers are able to sell this commodity. The situation with respect to raw materials has not shown any improvement. Much difficulty is being experienced in getting certain classes of materials from the United States due to the licensing system in vogue there. There has been no marked improvement in the building situation within recent weeks, there being a disposition to let operations of this nature remain in abeyance except where absolutely necessary. A heavy demand on valves continues to be a feature of the trade with manufacturers.

Toronto, Sept. 13.—From some sections of the West reports of fairly good building programmes have been received. These buildings are mostly public undertakings, building of hotels, terminal buildings, harbor improvements, etc. An estimate of the building programme under way in British Columbia at the present time places the total at $12,500,000. This is a very creditable showing and indicates that that province has not lost heart even in the face of a big decrease in population by reason of the war. There is every prospect that once the war is over industrial recovery will be rapid. But when will the war be over—that is the question. The only thing to be done is to hope and saw wood in the light of the opportunities that the present offers.

Wrought Pipe Market is Still Restricted

WROUGHT PIPE. — Manufacturers of wrought pipe report there has been no improvement with respect to getting supplies of raw materials. There is a shortage in many of the heavy sizes of pipe in consequence. Their operations are hampered through the working of the licensing system in operation in the United States on iron and steel. Delays are occasioned on account of the routine through which these licenses must pass before the goods are finally released. Demand for pipe is somewhat light owing to the high prices that have been necessary. Prices remained unchanged at the quotations of July 5 list.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917.

Standard Buttweld.

	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 5 00	$ 6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00

Standard Lapweld.

2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES.

4" and under, 45%.
4" and under, running thread, 25%.
4½" and larger, 40%.

STANDARD COUPLINGS.

4" and under, 35%.
4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces.

Cast Iron Enamelware Holds at Readjustments

ENAMELWARE.—Prices of cast iron enamelware remained unchanged during the time since last issue when readjustments and lower prices were recorded on lavatories. Drinking fountains and bubblers were also lines to be affected, as recorded in our last issue, changes being in a downward direction. Such price movements are welcome to the plumbing trade as they give hope that the day will come when lower prices will prevail more generally and a better demand will again be brought about.

Bath-tubs, roll rim, 4. 4½. 5 feet. 24 to 30 in. wide	$32 10
Bath-tubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple	16 80
Closets, oak tank and seat	22 00
Do., enamel iron or white vitro tank	23 75

Steady Market for Soil Pipe and Fittings

SOIL PIPE FITTINGS.—Prices remained stationary on soil pipe and fittings, cast iron pipe fittings and malleable fittings. Advances were recorded in some of these lines in our last issue. A fair demand is reported on these commodities. Following are the discounts:

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	10%	15%
Cast elbows, tees, etc.	10%	15%
Plugs	....	30%
Bushings	20%	33%
Flange unions, standard	....	20%
Dart unions, ¼-inch to 2-inch	20%	25%
Do., 4½ in. and larger	....	15%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4-in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.	0 50	0 63
Do., Class B, lb. net	0 22	0 33
Do., Class C, lb. net	0 15	0 22

Excellent Demand on Valves Still Continues

VALVES. — Manufacturers report that they are still running to capacity in their plants on the making of valves, the demand continuing especially good on steam work. Industrial development that has been taking place in Canada within recent months accounts for the continued good reports on this branch of industry. Prices remained unchanged.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard.	53
High grade	50

Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard.	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Oakum Quotations Remain Unchanged

OAKUM.—Quotations on oakum held in steady position during the week, prices ranging from $8.50 to $10 per hundred pounds in bale lots, actual figures given being $8.50, $9 and $10. Marine oakums were also unchanged. Demand is somewhat light.

		Per 100 lbs.
Best American	....	$21 00
U.S. Navy (American)	....	20 00
Plumbers' Spun	8 50	12 00

Range Boilers Hold Without Change

RANGE BOILERS.—No improvement is noted in the raw material situation for the manufacture of range boilers. Heavy demand for shipbuilding plates has caused supplies to be diverted from the class of materials used in the manufacture of boilers. Prices remained steady and unchanged.

30-gallon range boilers, standard	$13 00
35-gallon standard	14 50
40-gallon standard	15 50
52-gallon standard	28 00
30-gallon, extra heavy	17 00

Galvanized Sheets May Go Up Again

SHEETS, PLATES.—The decline of 75c per 100 pounds in certain quarters on galvanized sheets seems in fair way to be short-lived, judging from intimations made by dealers during the week. The Customs Department has recently made a decree that the payment of duty on 25 per cent. excess value at the date of purchase applies from the time when the specifications for order were sent to mills. In other words, contracts that were made last October with mills, and on which specifications for shipment were not made until March or April of this year, will be considered as dutiable according to the price obtaining at the date of specification. This is sufficient to cause the dealers to lose the advantage which they formerly apparently had under the rule of duty payable at the time of purchase, which is understood to be the time of contract. Dealers have been to Ottawa to interview the authorities with respect to the new ruling, and if the powers there are implacable, it is possible those concerns who reduced their price will return to the base of $12 for 10¾ oz. Some stocks of both galvanized and black sheets continue to accumulate.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$	$11 50
12 gauge	10 05	11 60
14 gauge	9 95	11 65
16 gauge	10 00	11 75
18-20 gauge	9 80	10 80
22-24 gauge	9 85	10 85
26 gauge	9 90	10 90
28 gauge	10 00	11 00
29 gauge	10 10	.....
3-inch inch plate	.....	12 25
¼-inch boiler plate	....	12 00
GALVANIZED SHEETS—		
10¾ oz.	11 25	12 00
U.S. 28	10 95	11 70
U.S. 26	10 65	11 40
22 and 24	10 50	11 25
18 and 20	10 35	11 10
16	10 20	10 95
14	10 10	10 85

Suspense Has Caused Unsettled Conditions

CORRUGATED SHEETS, EAVETROUGH.—There is an unsettled condition in the market for corrugated sheets, as buyers have been holding off awaiting developments in the United States. Dealers anticipate that stocks in retailers' hands are low, and that when something definite turns up there may be a rush of buying. There has been some buying of a hand-to-mouth nature, but only immediate needs are looked after. Prices remained unchanged for corrugated sheets, eavetrough and conductor pipe, the two latter commodities being quoted at 10 per cent. off list.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7.20
No. 26 gauge	9.60-10.00	....

Boiler Tube Stocks Are Getting Lower

BOILER TUBES.—With the recent demand for boiler tubes there has been a noticeable diminution of stocks owing to the failure of dealers to get additional supplies from the manufacturers in the United States. However, it is anticipated there will be sufficient stocks on spot to see the needs of the trade through the present calendar year. There have been fairly heavy demands for boiler tubes within recent weeks both for repair work and on new installations. Prices held unchanged during the week.

1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
4-inch	82 00	67 00
3½-inch	70 00	55 00

Lead Pipe And Waste Pipe Decline 1c Pound

LEAD AND ZINC PRODUCTS.—Following the easier tendency in the pig lead market a reduction in the price of lead pipe and lead waste pipe has been made effective during the week to the extent of 1c per pound. Lead pipe is now quoted at 18c per pound. and lead waste pipe at 19c per pound. Lead traps and bends remain unchanged at 20 per cent. advance on list. Lead wool and lead sheets, together with solder. remain unchanged. Demand for lead and zinc products is only fair.

Lead pipe, lb.	$ 0 18	....
Lead waste pipe, lb.	0 19	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 16	0 17
Lead, caulking, lb.	....	0 14¾
Lead sheets, 3 lbs. sq. ft.	0 17¾	....
Lead sheets, 3½ lbs. sq. ft.	0 17¾	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 17½	0 17¾
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 40	....
Solder, strictly, lb.	0 37½	0 38¾
Solder, commercial, lb.	0 36	0 38½
Solder, wiping, lb.	0 34	0 34¾
Solder, wire, lb.	....	0 41
Zinch sheets, per lb.	0 26	....

Heavy Zinc Lower; Heavy Copper Up ½c

OLD MATERIALS.—Old heavy zinc declined 1c per pound during the week, making the quotations now from 5½c to 6c per pound. Lower prices were induced from the easier condition in the primary market and the lack of demand on the part of consuming mills. Old heavy copper, on the other hand, was up ½c per pound, making the quotation 22½c. No. 1 railroad wrought iron was lower by $1 per ton at $21. No. 2 railroad wrought was also easier, being quoted from $9.50 to $10 per ton. There is very little anxiety to buy on the part of consuming mills, and collectors on the other hand show a disposition to hold their stocks.

Tea lead	$ 0 07½	.....
Heavy lead pipe	0 09¼	.....
Yellow brass	0 14¾	0 15
Red brass	0 20	.....
Light brass	0 09½	0 10
Heavy zinc	0 05½	0 06
Heavy copper	0 22½	.....
Stove plate, per ton	17 00	18 00

Lead Goes Lower; Tin and Copper Firm

INGOT METALS.—There was a sagging tendency in lead in the primary market during the week but tin and copper on the other hand gave evidence of greater firmness. Business locally in ingot metals continues to be light, as there is only a hand-to-mouth buying. Wholesale dealers report that where they would formerly make one sale to a concern in a week they are now making three. Orders are light owing to the unsettled condition in the markets generally.

COPPER.—Prices were unchanged in the local market for casting copper at 31c per pound and demand was of a hand-to-mouth nature with more inquiry noted. In the primary market at New York an advance of 1c per pound was recorded during the first of the week. Copper has been gathering strength owing to the announcement that a considerable quantity of copper had been taken by the United States Government on behalf of Allied Governments and that 25c had been paid.

TIN.—A more active demand was noted in the primary market for tin and prices in that quarter were higher in accordance. Locally the demand is showing improvement and prices held firm at 64c per pound.

LEAD.—There was a disposition to

(Continued on page 29.)



CONTRACTS AWARDED

J. McMurphy, 224 Queens Ave., has been awarded the contract for sewer on Princess Ave. by the city council.

Timmins, Ont.—A. Brazeau, Timmins, has the heating and plumbing contract for school for the Separate School Board. Cost, $37,000.

London, Ont.—The city council has awarded the contract for construction of storm sewers on Maitland Street to the Webster Construction Co. Cost $7,000.

Cardinal, Ont.—L. E. Moulton & Co., Ltd., have been awarded the plumbing contract on $30,000 factory addition for the Canadian Starch Co., 164 St. James St., Montreal.

TRADE GOSSIP

Sorel, Que.—Wilbrod Dallaire has been registered for Dallaire & Frere, plumbers.

Conroy Bros., plumbers, Montreal, Que., have dissolved. P. J. Conroy is registered.

A. W. Smith, plumber, Calgary, Atla., has sold to Patton & Gibb Plumbing Company.

Port Dover, Ont.—By-law carried for waterworks system to cost $65,000 and work will start as soon as possible.

TORONTO SOCIETY MEETINGS

The winter sessions will commence, in connection with the Toronto Society of Domestic, Sanitary and Heating Engineers on Wednesday, Sept. 19.

This being the opening meeting it is to be hoped that a majority of the members of the executive will be on hand.

Several very important matters are to be discussed, one being the question as to what kind of pipe should be used for soil pipe in buildings.

The new Parliament Buildings now under construction at Ottawa are to be fitted up with certain kind of piping, that up to date has not warranted the continuance of its use. Hence the question will be opened up at that meeting and discussed.

Without doubt if the sanitary engineers of Canada are to rise up to the worthy heights their title infers, no material of any kind should be used that is not as "long-lived" as the building in which it is installed. From now on the interest of the public stands first, last and always, and, when properly advised, the public is always ready to pay for services rendered.

BRANTFORD CLUB NEWS

A social gathering of several members of the sanitary and heating trade took place in Brantford recently when the Brantford Club had as guests, members of the trade from Kitchener and Waterloo.

A splendid time was given the visitors, and a number of the good things being accomplished by the Brantford boys were discussed. We are informed that such meetings will be more frequent during the coming winter season.

Your paper was sponsor for a letter that appeared in the Ottawa Press, reference the "Durham System of Plumbing" for the Parliament Buildings.

It seems that a misconstruction has been placed on this controversy by some people, judging from reports coming to us, and we wish you to make announcement through your trade paper that the Dunham System of Heating was not the object of your attack, nor has any connection whatever with the Durham System of Plumbing.

This company manufactures steam specialties for Dunham Heating Systems and does not manufacture or deal in plumbing systems or specialties of any kind.

Knowing you will appreciate the justice of our request, I am,

Yours very truly,
A. DICKEY (Signed),
General Manager
AJD/C. C. A. DUNHAM CO., Ltd.

It seems too bad that people should almost invariably put wrong constructions upon matters.

The above letter speaks for itself and the letter to which it refers appears as part of an article entitled, "Pipe Scandal at Ottawa," on pages 11 and 12 of this issue.

It will be plainly seen that the writer had no thought in his mind of involving the Dunham Steam Specialties. As every reader of SANITARY ENGINEER knows, there is no connection whatever between them and the Durham System of Plumbing, the latter term really being a misnomer, and with very few features to recommend it except that it conveys to the minds of sanitary engineers that wrought iron pipe and threaded joints only are adopted, while the Dunham System of Heating stands for one of the most modern methods of steam heating of our day, enjoying a reputation that everyone connected with the company is justly proud of.

EDITOR.

AN INTERESTING FOLDER

One of the most interesting folders to be issued for some time is one that was distributed to visitors of the National Exhibition just over in Toronto.

It was specially gotten up for rural residents, particularly farmers, a volume of very useful information to the farmer was included such as a drawing of septic tank with instructions as to what constituted a septic tank, and deprecating the use of cesspools, a number of other illustrations were described, with a full list of sanitary appliances that can be installed for the farmer so as to give him equally as good conveniences as are to be procured in any city home. Such publicity cannot but result in good business for sanitary and heating engineers.

MARKET REPORTS

(Continued from page 28.)

quote easier prices on lead in the local market, the range being from 13 to 13½c per pound, representing a decline of ½c in some instance. Easier conditions followed the trend in the primary market where a decline of ⅛c was recorded on the part of smaller producers. Demand locally is quiet.

SPELTER.—A slightly firmer tendency is noted in the spelter market during the week, quotations locally in certain instances ranging ½c up. In the primary market there was more inquiry and apparent better demand in sight and prices showed a greater measure of firmness.

ANTIMONY. — Quotations remained unchanged at 18c per pound. Demand is still light and interest in this metal is lagging.

ALUMINUM.—There was only a light trade in aluminum during the week, quietness being the prevailing characteristic of this metal. Prices remained unchanged at 60c to 64c per pound.

PIG IRON.—Inability to get supplies of coke owing to car shortage is causing the manufacturers of pig iron considerable concern. Production of coke in the United States is also reported to be declining owing to a shortage of labor. The market is in a waiting mood in the United States pending announcement with respect to price-fixing. Locally the condition is unchanged but car shortage is causing uneasiness.

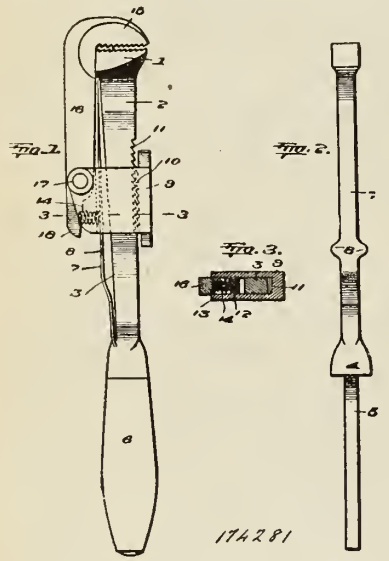
NEW CANADIAN PATENTS

(Continued from page 24.)

length between the side walls of the body and a coiled spring interposed between the transverse wall of the body and the inner arm of the shank on the movable jaw.

2. A wrench comprising a fixed jaw having a shank tapered at one edge and toothed at its opposite edge, a spring plate fixed at one end to said shank and spaced from the tapered edge thereof, a toothed body movable on the shank and plate and engaged by the plate, a movable jaw having a shank pivoted at an intermediate point of its length to the body, and yielding means interposed between the inner arm of said shank and the body.

3. A wrench comprising a fixed jaw having a shank toothed at one edge, a spring plate carried by the shank and extending longitudinally thereof and spaced from one edge of the shank, a toothed body movable longitudinally and laterally on the shank and plate, a movable jaw having a shank pivoted at an



No. 174,281. Wrench.

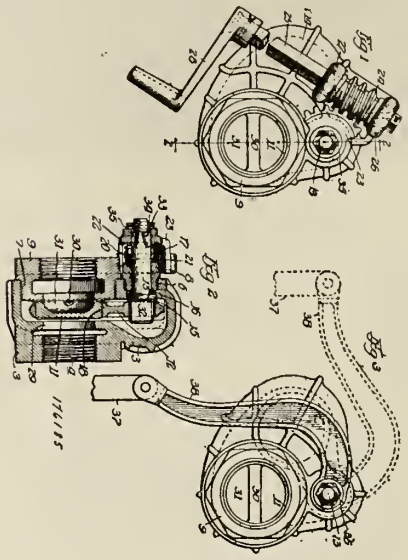
intermediate point of its length to the body and also having a portion extending rearwardly of the pivot point, and means engaging said portion for yieldingly pressing the same outwardly.

No. 176,185.

The Okadee Company, Chicago, Illinois, assignee of Thomas W. Demarest, Fort Wayne, Indiana, both in U.S.A., 3rd April, 1917; 6 years. Filed 12th November, 1915. Receipt No. 257,908.

Claim.—1. A valve comprising in combination a valve casing member, a movable valve operating member having slidable and non-rotatable connection with said passing through the casing into the pressure side of the valve, an enlarged portion on said last-mentioned member adapted to make fluid-tight contact with the valve casing under the pressure of the fluid, and a spring arranged externally of the casing and adapted to act on said last-mentioned member in the same direction as the fluid pressure.

2. A valve comprising in combination a valve casing, a valve closing member, a movable valve operating member valve closing member, an enlarged portion on said valve operating member adapted to make fluid-tight contact with the interior of said casing, and a spring externally ar-



No. 176,185. Valve.

ranged for holding said valve operating member in fluid-tight contact with said casing.

3. A valve comprising in combination a valve casing, a detachable seat adapted to close an aperture in said casing, and a valve closing member of less diameter than said aperture provided with means on the surface adjacent the valve seat for withdrawing it from the casing through said aperture.

4. A valve comprising in combination a valve casing, a detachable valve seat adapted to close an aperture in said casing, a valve closing member of less diameter than said aperture having a recess on the side adjacent the valve seat, and an integrally formed bridge portion arranged across said recess.

5. A valve comprising in combination a valve casing, a valve closing member, a valve operating member, an enlarged portion on said last-mentioned member adapted to make fluid-tight contact with the interior of the valve casing under the pressure of the fluid, a member adapted to move said last-mentioned member.

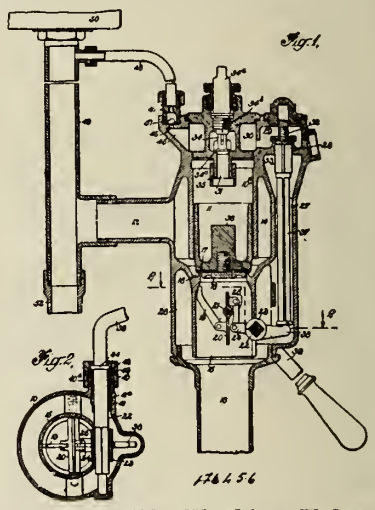
No. 176,456.

William Sears White, Denver, Colorado, U.S.A., 17th April, 1917; 6 years. Filed 2nd March, 1917. Receipt No. 276,-435.

Claim.—1. A flushing valve having an inlet for water, a water outlet, a water chamber in communication with said inlet and outlet, a valve in the said chamber controlling communication between the inlet and the water chamber and between the said chamber and the outlet, an air chamber normally closed from communication with the water chamber, and means whereby to raise the said valve and to establish communication between the top of the water chamber and air chamber with the raising of the valve whereby the captive air will pass from the air chamber to the top of the water chamber and be returned with each flushing operation.

2. A flushing valve including a container having an inlet and an outlet, a water chamber in the container, a vertically movable valve in said chamber controlling communication between the inlet and said chamber and between the said chamber and the said outlet, a normally closed by-pass between the top of the water chamber and the outlet, and means for opening the by-pass with the raising of the valve.

3. A flushing valve including a container having an inlet, an outlet, a water chamber in communication with the inlet, a manually controlled valve movable vertically in the said chamber commanding the inlet, an air chamber in communication at the bottom thereof with the outlet, passages establishing communication between the top of the chamber and the air chamber, and including a by-pass leading upwardly from the air chamber at the side of the water chamber, valve means associated with the by-pass to permit overflow of water from the water chamber and permit inflow of air thereto from the water chamber and permit inflow of air thereto from the air chamber, and means to open the valve means of the by-



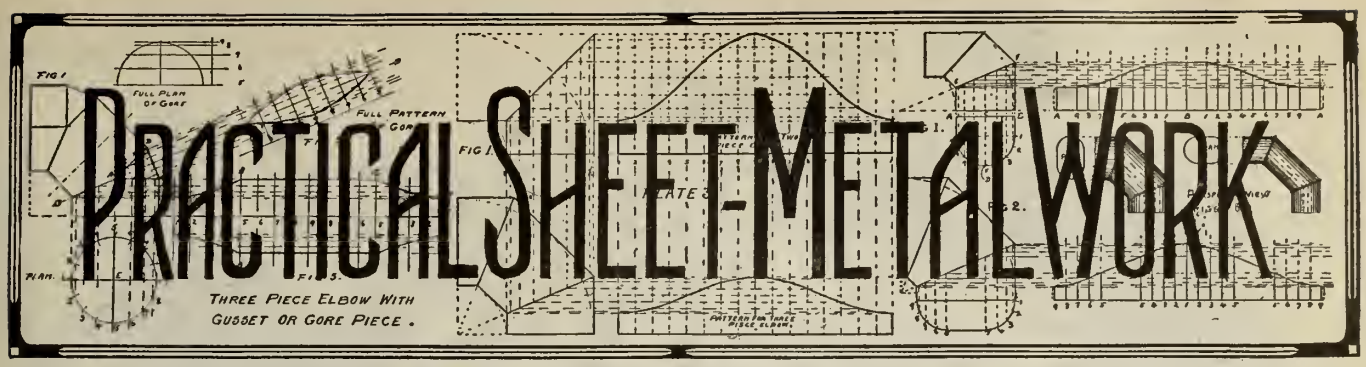
No. 176,456. Flushing Valve.

pass when the first valve is to be raised, the said air chamber being closed except for the said open lower end and the said by-pass.

4. In a flushing apparatus, a reservoir adapted to contain flushing water and having a water inlet, a water outlet for discharge of the flushing water, valve means controlling communication from the reservoir to said outlet, an air chamber, and means to direct the air in said air chamber to the reservoir at the top of the latter in discharging said reservoir and for returning the air to the air chamber in the filling of the reservoir.

5. A flushing valve including a container having a water inlet and a discharge outlet, a water chamber to which the inlet leads, said chamber being open at its lower end in the direction of the discharge outlet, a vertically movable valve in the chamber commanding the inlet and commanding the discharge from

(Continued on page 34)



BY THOMAS STANFIELD

AS most of the readers of Sanitary Engineer who read these articles on sheet metal work are interested in warm air furnace work, it will not be out of place to mention at this stage in the course some points of importance regarding the construction or rather the installation of warm air furnaces.

Two things which are sadly neglected in warm air furnaces are the casing and the covering of the warm air pipes.

Some of the finest and best designs of furnaces are not given fair treatment, and, therefore, do not give the results that they would, because of badly made casings and bare piping.

Ninety per cent. of the houses built to-day comprise basement, first and second floors, and possibly two rooms in the attic, and the basement, it would be safe to say, takes up at least 25 per cent. of the area of the whole house.

Now if we consider for a moment or two the amount of heating surface which is left exposed in the basement, it is no wonder that this part of the house is often warmer than it should be, to the disadvantage of the rooms above, which require the heat, and for which the furnace is really installed. The reason for this is that there is too much heating surface in pipes left bare, from which the heat escapes. This means that the furnace is generating heat, and that heat is being poorly distributed.

The remedy is, a casing with a good asbestos lining between the galvanized outer casing and the inside tin casing. The best form of asbestos, as far as experienced by the writer, is the air-cell asbestos. One ply is ample, providing the top and the bottom of the cells are closed up.

The piping, too, should be covered with the same material. It can be fitted very easily and strapped on after the piping is installed, just in the same manner as is adopted when covering steam or hot water piping.

To fit this kind of asbestos on to the elbows, use the pattern of the elbow to cut the asbestos by, and very little waste will be made.

The single ply common asbestos paper is little improvement on common bare pipes.

In repair work, say a furnace too small has been installed, which is very often the case with houses that have been built for speculation. The writer has improved many a furnace by simply putting a single covering of air-cell paper on the outside of the casing, and, along with pipe covering, has made a furnace answer the purpose. To show how such a method will save fuel, or in some cases improve the distribution of heat units generated, we will assume that the basement is 25 per cent. of the total area to be heated, and the heat of the basement is 72 degrees Fah.; and we will also assume that the average heat of the rooms upstairs is 68 degrees Fah., without doubt the covering of the furnace and pipes will result in a conserving of heat, or rather reducing the temperature in the basement to approximately 62 degrees. Then by dividing the 10 degrees among the rooms above an approximate of 71 degrees will be procured; or if the rooms upstairs are warm enough, a saving of at least 10 per cent. on fuel can be effected easily.

Another very important matter which not only affects warm air furnaces, but all other furnaces too, is that of the chimney.

How many furnaces have been given a poor reputation because of a faulty chimney? A chimney may be too small in many ways. Some may be built a little lower than the ridging of the house, or it may have another building soaring higher than it does, and thus obstruct the outlet at the top. Some authorities will allow a certain number of square inches to a given number of cubic feet of space to be heated, and do not take into consideration the shape of the chimney flue. This method is altogether wrong. The natural tendency of rising smoke takes the form of a spiral whether the smoke be enclosed or not.

Just to illustrate our argument—if a fire is built in the open and there is no movement in the air, it will be noted that the smoke will curl round and round in an upward motion. The same when enclosed in a chimney flue; therefore, if a round chimney is built, say 8 inches in diameter, it will have an area of 50.265 square inches, while the same chimney 8 inches square would have an area of 64 square inches, and would be none too large.

The following table for chimneys ranging from 40 to 60 feet in height will be found a fairly safe rule to follow:

***TABLE OF CHIMNEY FLUE SIZES FROM 40 TO 60 FEET IN HEIGHT.**

Cubic contents to be heated.	Round tile smooth pipe	Brick inside dimensions
10,000 to 15,000	8 inches	8 x 8 square
15,000 to 25,000	10 inches	8 x 12 rectangle
25,000 to 40,000	12 inches	12 x 12 square
40,000 to 75,000	16 inches	12 x 16 rectangle

*From Progressive Furnace Heating, by A. G. King.

ATMOSPHERIC POLLUTION

(Continued from page 16)

Then there is coke in plenty to be had where gas is manufactured. If the Canadian heating engineer would turn his eyes to gas fired furnaces, oil burners and the like, as well as the most up-to-date heating appliances, instead of being satisfied to install inferior or out of date heating systems, our smoky towns and cities would soon be things of the past, not only so, but coal would be conserved, and a thousand and one of the ills which humanity appears to be heir too, but is not, would soon disappear.

The recent National Exhibition held in Toronto was a revelation in heating appliances. Gas fired, coal fired and electric heating appliances took up a great deal of space.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

CANNOT GET WATER

Editor SANITARY ENGINEER:—

Being a subscriber to your paper, I would like to get some information regarding a drive point for water.

I bought a special point 1¼ inch with screen, and have driven it down 35 feet, but cannot get water yet. I have in use a single suction pump and cannot tell where the trouble is, whether the pump is not suitable for a long lift or I am not down far enough into the ground.

There seems to be a vacuum in the pump, I have tried priming the pump but without success.

Please let me have some information on this subject that will assist me to solve the problem.

F. V. W., Ontario.

In the first place it is not possible for any ordinary single suction pump to lift water from a point deeper than 32 feet or so, and very few pumps will pump water for any length of time more than 20 feet.

It may however, be the fault of the pump, or on the other hand it is possible that there is no water to be procured at the depth named. The writer would advise our inquirer to take a rod and place it down the pipe so as to determine whether there is any water in the pipe, and if found at say 20 feet, it is the pump that is at fault.

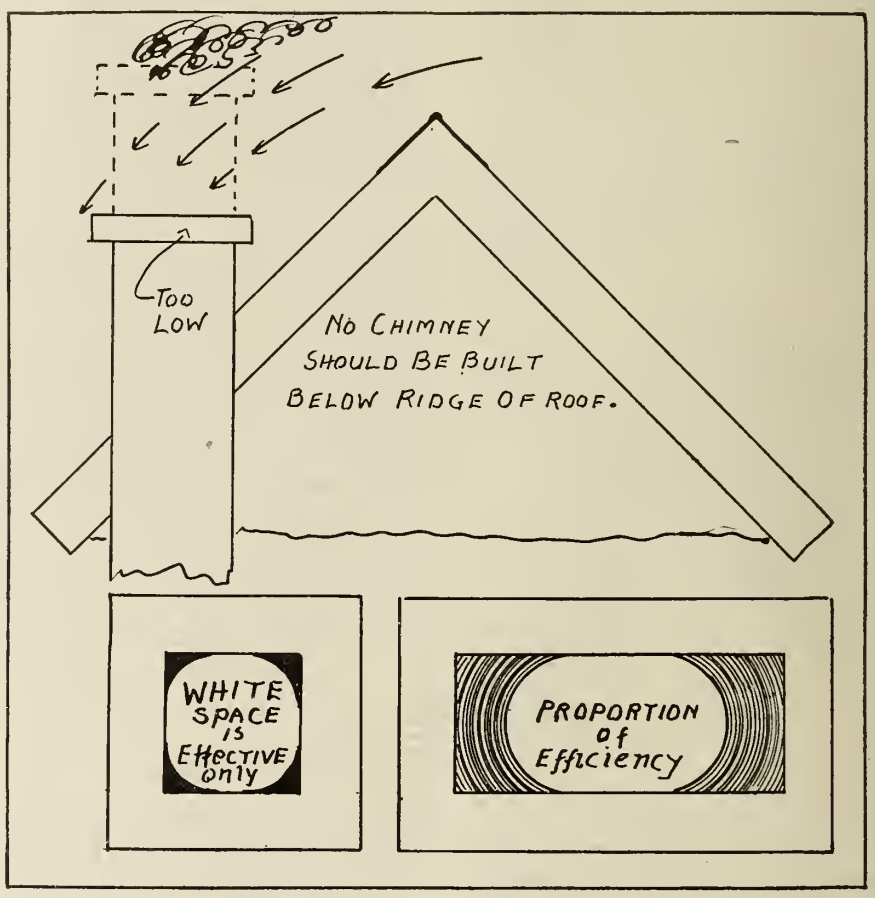
If however, there is no water in the pipe there is only one course to follow and that is to drive further down and fit a cylinder at a point not more than 20 feet from the end of the point. This would mean of course that 15 feet or so of the pipe already driven down will have to be withdrawn to enable the cylinder to be fitted on it.—Editor.

CHIMNEY QUERY

Editor, The SANITARY ENGINEER.

I have to figure on installing a new boiler in a building in which there is about 1,700 sq. ft. of radiation.

I first proposed to put in a tubular,



but would not guarantee the job unless the chimney, flue were enlarged. At present, it is a rectangle shape, 9 x 24 inches, which is a very bad shape. It is straight and about 40 feet high and away above the surrounding buildings.

A traveller for a certain boiler concern called on my customer and said the flue would do if a stack were put on the chimney, also that pea coal could be used with satisfaction.

I figure that the flue should be 18 x 18.

FITTER.

To be perfectly frank about the above question is to say that there are no data regarding chimneys that are absolutely correct under all conditions. It is a question of practical judgment on the part of the heating engineers and boiler manufacturers.

The following table, by Prof. R. C. Carpenter, however, will answer fairly well under ordinary conditions, but where specially constructed boilers for which manufacturers of same make certain claims, it has been found good policy to ask the manufacturer to assume responsibility for the system.

One thing, however, we will say, and without fear of contradiction, that is, that the architect or builder who plans a chimney of such extreme and unequal proportions should be kicked out of the

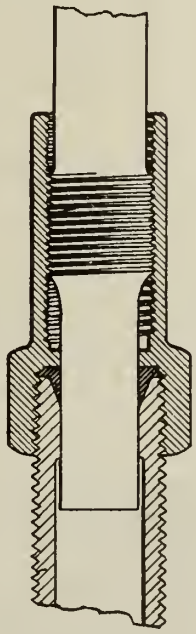
(Continued on page 34)

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(Letters Patent No. 162,577)



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SARNIA, ONTARIO

QUESTION BOX

(Continued from page 30.)

profession. The real efficient working space is only equal to about half the total area. See sketches accompanying this article as to capacity of rectangle chimneys.

We would not demur a moment as to the working of the system if the manufacturer is quite satisfied to instal his boiler under the conditions specified.

DIRECT RADIATION*		HEIGHT OF CHIMNEY FLUE					
Steam in sq. ft.	Water in sq. ft.	20 ft.	30 ft.	40 ft.	50 ft.	60 ft.	83 ft.
250	375	7.4	7.	6.7	6.4	6.2	6.
500	750	9.6	9.2	8.8	8.2	8.	6.6
750	1,150	11.3	10.8	10.2	9.6	9.3	8.8
1,000	1,500	12.8	12.	11.4	10.8	10.5	10.
1,500	2,250	15.2	14.4	13.4	12.8	12.4	11.5
2,000	3,200	17.2	16.3	15.2	14.5	14.	13.2
3,000	4,500	20.6	18.5	18.2	17.2	16.6	15.8
4,000	6,000	23.6	22.2	20.8	19.6	19.	17.8
5,000	7.500	26.	24.6	23.	21.6	21.	19.4
6,000	9,000	28.4	26.8	25.	23.4	22.8	21.2
7,000	10,560	30.4	28.8	27.	25.5	24.4	23.
8,000	12,000	32.4	30.6	28.6	26.8	26.	24.2
9,000	13,500	34.	32.4	30.4	28.4	27.4	25.6
10,000	15,000	37.	34.	32.	30.	28.6	27.

*NOTE.—When a considerable amount of INDIRECT radiation is to be used, increased boiler capacity is necessary, and in many cases such demands require a larger chimney flue for same number of square feet of radiation used.

To further explain the table regarding sizes and shapes of chimney and their practical efficiency, we might add that the figures given under the varying heights of chimneys are diameter measurements in inches, or the side of a square—the theory being that the spiral ascending column of smoke and gases will make a 12 x 12 inch flue no more extensive in practical working area than a 12-inch round flue. Rectangular flues may be used if the area is equal, providing the difference in the width and length is not too extreme.—Editor.

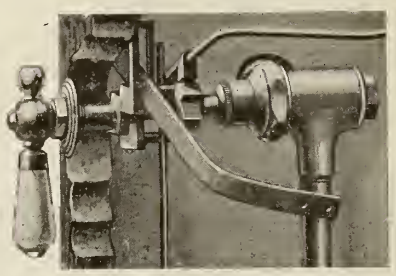
NEW CANADIAN PATENTS

(Continued from page 30)

the said chamber, means for raising the said valve, and valve means operable with the raising of the valve in the water in the water chamber for venting the latter.

6. A flushing valve including a container, having a water inlet, and a discharge outlet, a water chamber in communication with the said inlet for the admission of water thereto, and in communication with the said outlet for the discharge of water, a vertically movable valve in said chamber commanding the inlet, an air chamber subjacent the water chamber, passages connecting the air chamber with the water chamber near the top of the latter, and means for controlling the discharge of air from said passages to the water chamber to vary the flushing period by controlling the descent of the valve in the water chamber, the air chamber being closed except at its lower end.

7. A flushing apparatus comprising a reservoir to contain flushing water, said reservoir having a water inlet, an outlet for the discharge of flushing water from the said apparatus, valve means controlling communication between said reservoir and the said outlet, and an air chamber having an open lower end for the inflow and outflow of flushing water, there being passages connecting the air chamber above the open lower end thereof with the top of the reservoir, the air chamber having an open lower end for the inflow and outflow of flushing water, there being passages connecting the air chamber above the open lower end thereof with the top of the reservoir, the air chamber being closed except for the said lower end and said passages, whereby air will alternately pass to and from the reservoir and air chamber in the emptying and filling of the reservoir.



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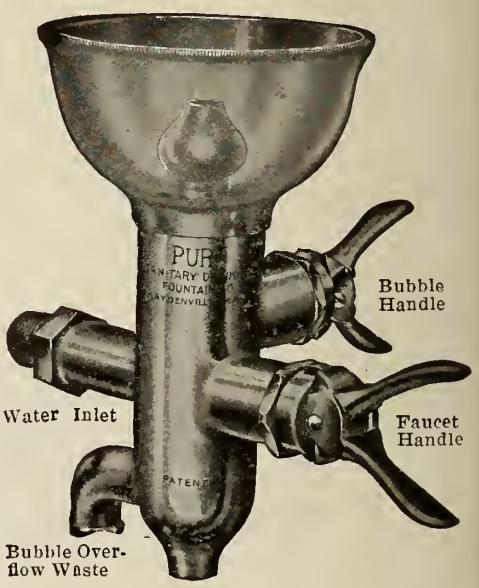
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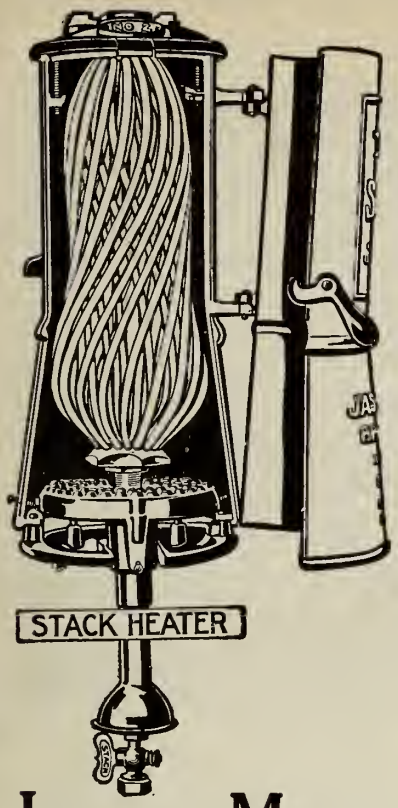


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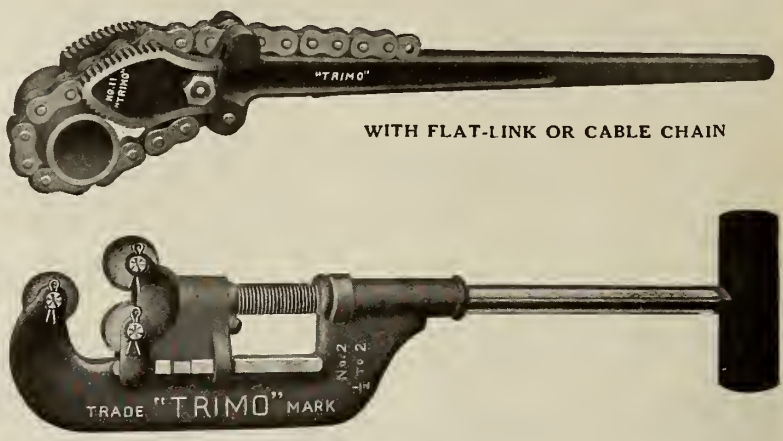
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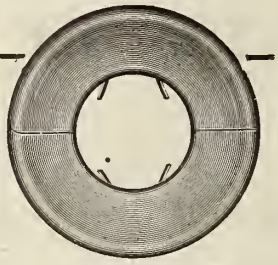
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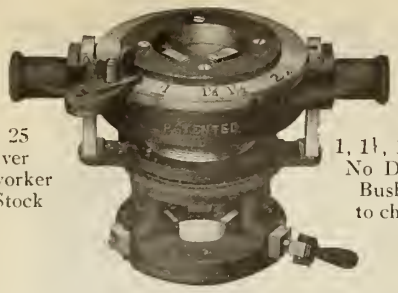
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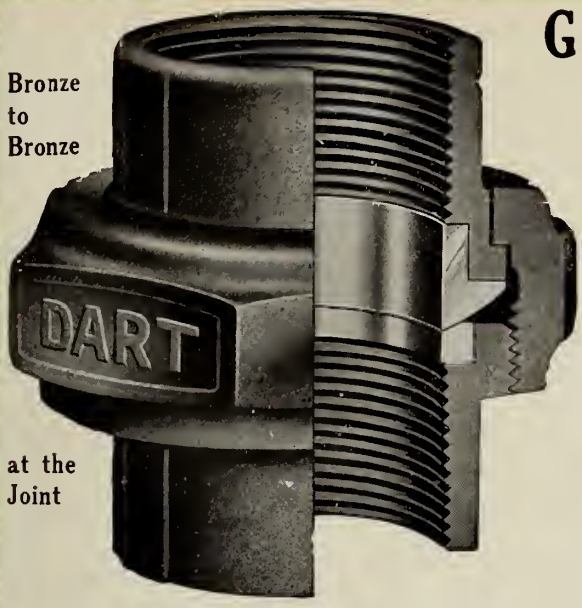
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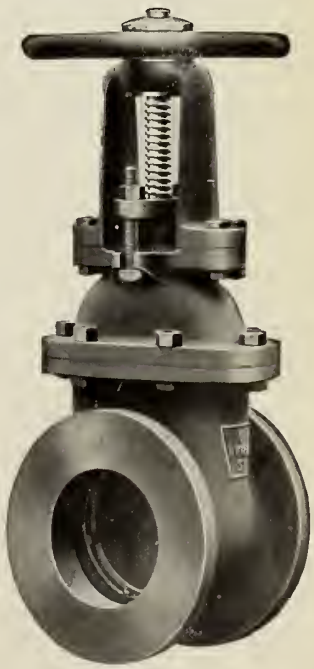
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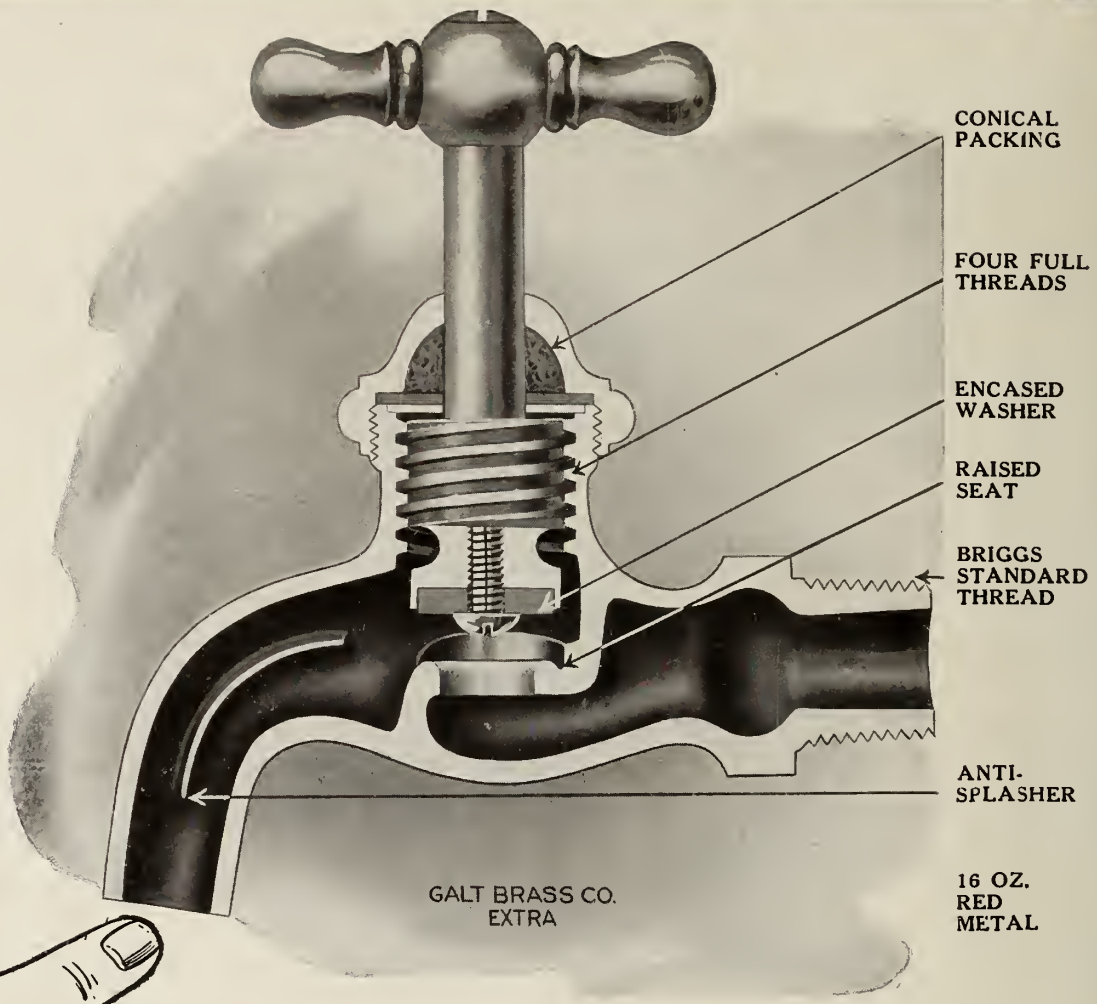
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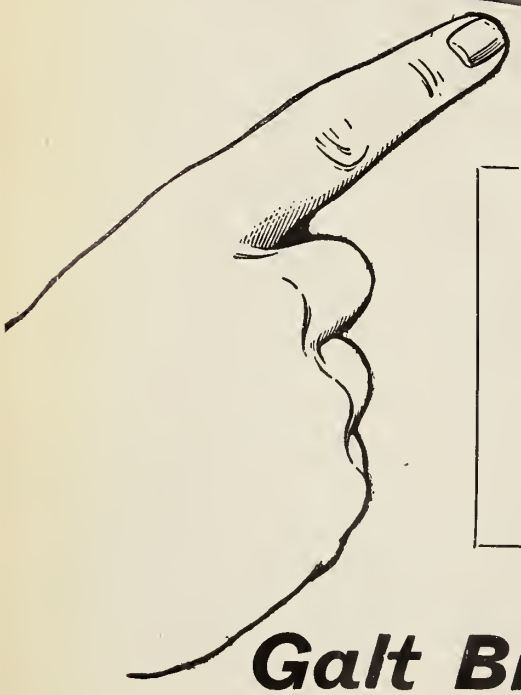
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SEND US YOUR ORDER NOW

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Vol. XI | Publication Office: TORONTO, OCTOBER 1, 1917 | No. 19

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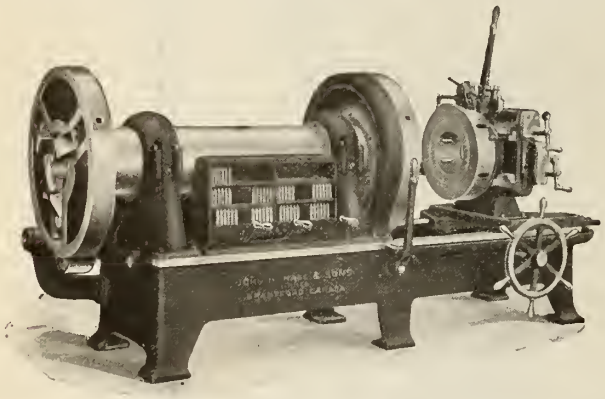
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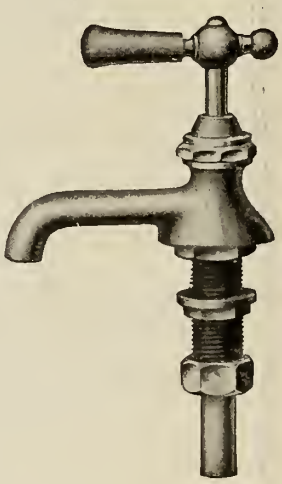
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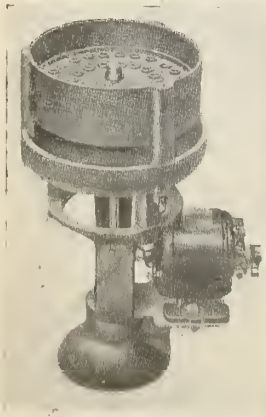
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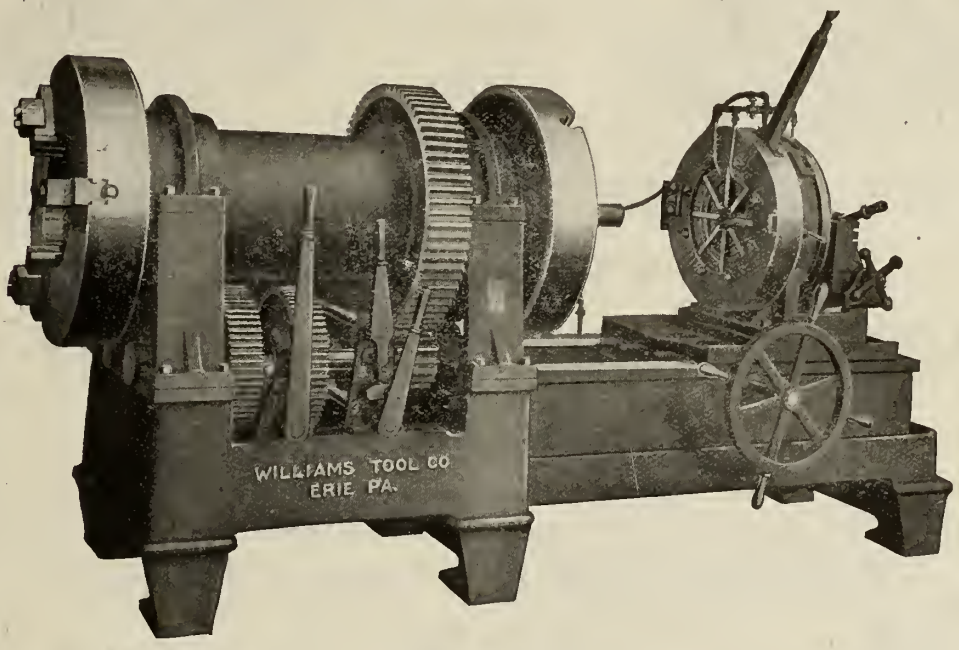
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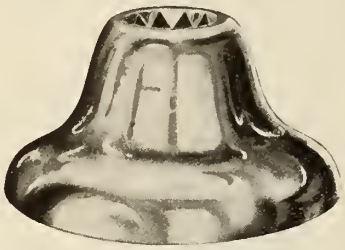
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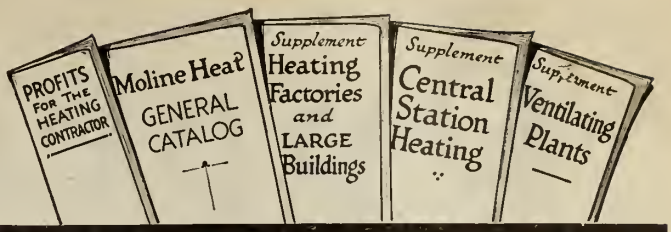
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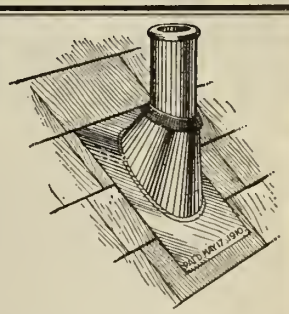
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BELAND
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Stringer, Fraser, Leacock and Hendryx

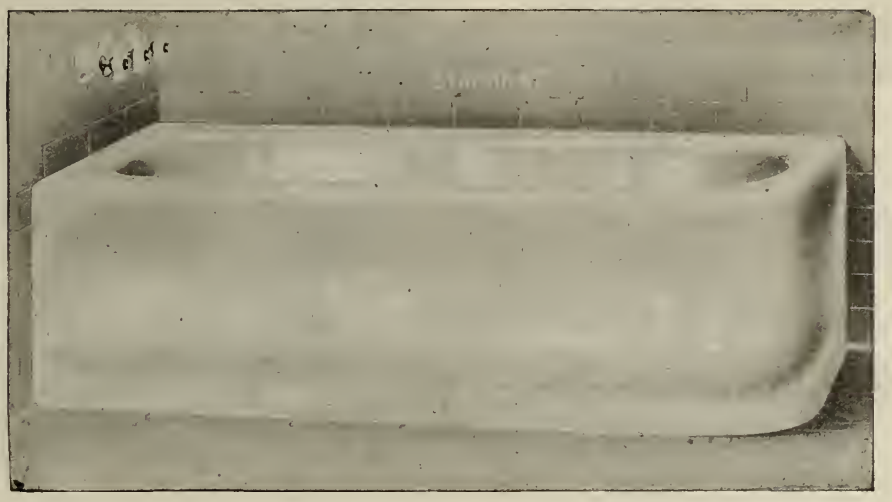
THE work of these masters of the short and long story appears in the October MACLEAN'S. Stringer's story is "The Redeemer of Waste Lands"; W. A. Fraser writes a love story, "For Catherine's Sake"; Leacock has a humorous sketch; and Hendryx continues his captivating story of the Canadian Northwest, "The Gun Brand."

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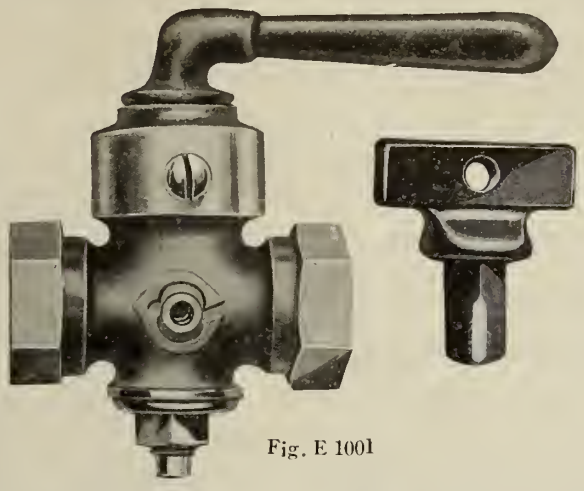


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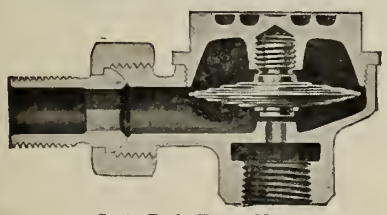
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SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, OCTOBER 1, 1917 No. 19

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Wrought Iron vs. Cast Iron for Soil Waste and Drainage —The Paper That is Not Wanted—The Value of the Trade Press.

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SANITARY ENGINEER

VOL. XI OCTOBER 1, 1917 No. 19

The Labor Problem in Great Britain

How the Problem is Being Handled—British Minister of Labor Writes the Story Which Appeared in "Factory," the Magazine of Management, Chicago.

By Right Hon. John Hodge, M.P.

AS soon as it was realized that the war was going to be a war of material, and that our country was short of guns and shells, the Government decided to create a new department called the Ministry of Munitions, of which Lloyd George, on account of his inspiring personality and organizing ability, was selected to take charge.

The first action that he took was to convene a conference of all the leading trade union officials in the country. At that conference he took the delegates into his confidence and explained to them very fully many things which could not possibly be published to the world at large.

To them he put forward the proposal that, the crisis being so grave, trade unionists should give up some of the customs, privileges and conditions of employment which they had been fighting to obtain for the past hundred years. On behalf of the Government he gave them to understand that when peace was declared every condition, custom or privilege of labor should be restored to its old footing.

The delegates agreed almost unanimously to the suggestions, and those who voted against them did so because they could not commit themselves without consulting their management committees. When the delegates reported to their respective organizations, I do not know of a single instance in which the proposal was rejected.

It may be well to name the concessions made by labor:

(a) They permitted what is commonly known as dilution of labor. A fitter or engineer now simply acts as supervisor; keeping the tools in good condition and teaching unskilled and semi-unskilled men how to operate the machines.

(b) They annulled all restrictions respecting overtime.

(c) They annulled all restrictions on working machinery to its utmost capacity, and other similar practices.

(d) They agreed to work on Sundays when necessary.

(e) They gave up all holidays as desired.

(f) They admitted women to a great many occupations in which their presence had hitherto been objected to by both workmen and employers.

Inevitably the development of shell and gun output, the great new programme for the building of warships, aeroplanes, and merchant vessels, and recruiting for the new armies brought about a great shortage of labor. It was foreseen that a natural consequence of this would be great competition among employers for all available skilled workmen, and consequently tend toward highly inflated wage rates.

In order to prevent an uneconomic transference of labor as a result of the inducement of inflated rates of wages, consequent on a shortage of labor, it was decided that no man should be enabled to leave one employer and go to another without a leaving certificate from the first employer. If that was refused, the workman was given a right to appeal to a tribunal, which would then render a decision as to whether his claim was legitimate or not.

All of you have sons and brothers and pals in the trenches, and every extra shell and extra gun you can help turn out may be the means of saving some of their lives.

If the services of a workman employed at any given establishment could be utilized to greater advantage at another, the Munitions Department reserved the right to transfer him without the consent of his employer.

There was no difficulty in getting labor to agree to these conditions, because of the great enthusiasm for the war, and, consequently, no propaganda meetings were necessary.

The great difficulty was to persuade some of the trades to open their doors to women. The objection of the workmen to the employment of women was that employers as a whole never employ a woman unless they can get her at lower wages than a man. The workmen naturally said, "If we permit women to come in under these conditions what will happen to us after the war? Women will be kept because they are cheap and men will not be wanted."

The result was an agreement between the Government and the trades unions, that if women were admitted to these trades, they should receive the same piece-work rates as men, and if paid by time rates, adult women workers must receive a minimum of $5 a week. That being so, when peace comes, there is no danger of the employer trying to keep women in the place of men.

It was difficult to get the employer to accept women on these terms; probably simply because they were women. The innovation necessarily caused expenditure. On introducing female labor into a factory for the first time it is necessary to provide separate lavatory and cloakroom accommodation, and to appoint women supervisors. There are always a certain number of rough spoken, ill-mannered men in a factory, and it is necessary to protect the women against them.

When the women were worked for the regular hours of men it was found that irregular attendance resulted and the output of the women decreased.

The welfare department of the Ministry of Munitions, with the help of Sir George Newman, very quickly realized that it was necessary to make some difference in factory conditions where women were employed.

Rest Periods for Workers

They, therefore, instituted rest periods of a quarter of an hour in the morning, when the young women could get a glass of milk, or a cup of tea or coffee. For the last ten minutes, wherever possible, the girls were asked to lie down flat on their backs. This relieved the tension on the muscles which had been strained by long standing at a machine. These rest periods were repeated in the afternoon, with the result that the output was maintained. As a matter of fact, the two intervals had a marked effect, in increased output and more regular attendance.

A woman supervisor has been appointed in every factory; where there are a great many women employees there is more than one. The women go to this

woman supervisor with all their troubles. If they have a cut finger or meet with any minor accident, they go to her or to the medical room for first aid. If a woman feels faint, the woman supervisor sends her to a rest room, where she is looked after by a trained nurse, who decides whether she will be fit for work in an hour or two, or whether she should go home for the remainder of the day. This applies to all of the 6,000 Government controlled establishments where women are employed.

As many of the girls employed came from long distances, and in a number of cases it was not possible for them to obtain food near the factories, canteens were erected in almost all of the factories or workshops. The woman supervisor looks after the food in these canteens and sees that it is maintained up to the standard.

Providing for Employees' Welfare

This general welfare work was found to be such a success among women that the authorities decided it could not be bad for boys. So in a great many establishments boys are now being looked after in the same way.

In the matter of feeding, the same problem confronted both men and women workers very often. Thousands of men were brought together from all over the country and factories were developed for the making of munitions beyond all imagination. It was necessary to feed these men in order to get good results. And where men are well fed, there is generally much less tendency to drink.

The Government, therefore, urged upon all establishments the necessity for opening canteens where proper feeding arrangements were not supplied. Of course there was much prejudice to overcome, but this the Government met by paying a proportion of the cost of the erection of canteens, dealing with each case on its merits in deciding this proportion.

After the war, the canteen system will stay, because employers have come to realize, as they did long ago in America, that it is profitable. Instead of having a dry meal with a can of cold tea, the workman goes to the canteen and gets a regular hot meal, and his output and general effectiveness are improved in consequence.

To speed up the arbitration of labor claims, tribunals of three have been formed. These are composed of a neutral chairman, a representative workman and a representative employer.

During the first twelve months of the war we had no great difficulty in getting labor to keep up the long hours, continual overtime, and absence of holidays. In fact, I may say that it is only during the last six or eight months that any trouble has arisen, from a variety of reasons, chief among which are the increased cost of living, wages not keeping pace with this, sometimes delays in dealing with differences, the long hours, monotonous toil over so long a period, and no holidays. These all contribute to a feeling of irritation which magnifies the little difficulties which come up until they assume big proportions.

The Labor Ministry was formed by Lloyd George to meet these deficiencies when he reconstituted the Cabinet in December, 1916. Our function is to act as intermediaries between the Government and labor, between employer and employee upon occasion, and particularly between the Ministry of Munitions and labor. It is our business to make the vast industrial machine run smoothly, in so far as the better understanding of and consideration for labor can aid in this direction.

It is impossible, right after the war, to go back to pre-war union customs because the cost of living will be high for some time after the war, and higher wages will be required to cope with it.

When I came in here I found that delay was one of the dangers at the root of such labor troubles as we have had. These delays will now be a thing of the past, so far as this department is concerned.

The Munitions Act provides that if any labor dispute lasts longer than twenty-one days without reaching a settlement, it must go before an arbitration board. But a great source of trouble has been the slowness of the arbitral machine. It has failed to see that delays cause irritation and are very dangerous. As a matter of fact, the whole of the recent trouble in Newcastle, when the engineering trade demanded an increase in wages, was due to the fact that the proceedings of this board were most unduly protracted and it took nearly five months to come to a decision.

Steps have now been taken to prevent that sort of occurrence—that is where the Ministry of Labor comes in. Ever since I came in here I have been working to get the machine expedited. One of the first things I did was to substitute national settlements for the local decisions.

For instance, on the 1st of April there was a general advance of 5s. ($1.20) a week in the shipbuilding and engineering trades that operated over the whole of the United Kingdom. This disposes of the whole trade at one swoop, instead of leaving perhaps a hundred different claims to be dealt with from time to time as they come up.

Arbitration of Labor Claims

Another means of speeding up the arbitration of these labor claims has been the formation of tribunals of three, composed of a neutral chairman, a representative workman, and a representative employer. The workman is not necessarily a trade union official; he may be taken from the rank and file. The advantage of having a workman and an employer on the tribunal is that they have a technical knowledge of the trade and are able to give an intelligent decision. You will understand that if the subject under discussion turns on some technical point a tribunal of laymen will frequently fail to grasp it.

Before becoming Minister when the Ministry of Munitions wished to get the employees of some particular factory to work on Saturday afternoon, or on Sunday, I wrote to them and said, "Your firm is very anxious to work through next week-end, because somebody is wanting steel for some particular purpose (and I stated the purpose)." Then I followed by saying, "I know that it is quite unnecessary to advise you men to do this; all of you have sons and brothers and pals in the trenches, and every extra shell and extra gun you can help turn out may be the means of saving some of their lives."

It is not necessary to make a demand. I get the answer back, "Of course we'll do it." And it gets done.

In the steel and iron trades there will be no trouble or disturbance of any kind after the war because we have made good in every respect and the employees fully appreciate it.

In this country the war has leveled the existing class distinctions to a very great extent.

Where a new industry springs up rapidly in any country there is always the danger that large bodies of men may have to be handled by inexperienced managers who will cause trouble simply through their lack of knowledge of human nature in the mass. In this country we have overcome this difficulty by developing our existing establishments.

The only new concerns that we have instituted are shell-filling factories, although, of course, the Government has erected a number of national shell-making establishments. In these cases the managers appointed were men who had been with existing firms and who were accustomed to handling large bodies of men. The danger of putting men who were not masters of the art of handling men in control of new factories was realized.

I was on the board of directors of one of these national factories. All of the board were selected as practical men, and at the beginning we met two or three times a week and went round the works with the manager after each meeting. If a man could not come to a satisfactory arrangement on any matter with the manager, he was always referred to us.

Capital must work with labor and labor with capital. There will be no room for strife between these two complementary forces, if we are to succeed in the industrial campaign of to-morrow.

From the very beginning there was not a single labor trouble beyond the usual administrative difficulties. Of course there were occasional disputes between the managers and individual gangs of men or gangs of women working with a skilled man as to what rates should be paid. But in every instance we were able to settle the matter satisfactorily.

The directors being in such close touch with the factory, everything went very smoothly. When we started we had a plant for making 500 shells a week; at the end of a month we were making 800, and this ratio of actual output to alleged plant capacity has always been kept up.

Where you have peace and contentment among the workers, output goes up. In the course of time the factory of which I am speaking developed until it was

Labor must give up its old restrictive attitude and capital must become willing liberally to remunerate extra effort and extra exertion on the part of labor.

turning out 15,000 shells per week with a plant that was designed to turn out 10,000.

The manager was always ready and willing to confer with any of his people who had a grievance to air and to apply an immediate remedy if possible. If the manager could not come to any satisfactory arrangement with the workers, they were allowed to appeal to the directors, and even if the directors thought that the grievance had no foundation, the very fact that they had been able to appeal and obtain a fair hearing of their side of the controversy in practically all cases gave satisfaction to the workers.

Tin-Plate Trade Hard Hit

Of course, many trades have been very hard hit by the restriction which the Government has been obliged to put upon exports. In the tin-plate trade, for instance, exports to Holland, Denmark, Norway and Sweden had to be prohibited, unless a license had been obtained, because the tin plate was finding its way to Germany. But, at the same time, there was a tremendous demand for steel. So everything possible was done to lay down new plants and to expedite production in the steel and iron trades.

Therefore, with the officials of the Steel Workers' Union, I helped to mobilize the idle tin platers for employment in steel works. In addition to that, some of them were drafted to armament factories which were enlarging their shell forging departments, and, consequently, required skilled men to take charge of the heating of steel. In this way we found occupation for about 1,200 of these men, with great benefit to shell production; for, being skilled workers, they caused fewer breakages and less waste.

Other trades have helped in transferring men from place to place to suit national necessity in the same way.

In the autumn of 1916 it was pointed out to the Ministry of Munitions that when a man is transferred from one district to another he can not afford to keep two homes on his ordinary pay. Such men were, therefore, made war volunteers, signing an undertaking to go wherever they were asked. For this they were paid either the rate of wages they received at home, or the rate prevalent in the district to which they were sent; always receiving the higher rate.

In addition to this a sustenance allowance of 17/6 ($4.20) a week was made to each married man, and to each unmarried man who was the only son of a widow. The single man with no dependents received no allowance, as expenses were no different for him whether he was in lodgings in Scotland or in Wales.

We hear a great deal of loose talk about the return of trade union customs and privileges after the war. But labor can not have it both ways. As I have said to men frequently: "'You can not maintain your high wage and, at the same time, go back to your old restrictive customs. If going back means returning to pre-war conditions it means going back to pre-war wages. It is impossible to go back to pre-war conditions because the cost of living will be high for some time after the war, and higher wages will be required to cope with it." But there will be no difficulties if the employers will play the game.

In this country, employers have never been so alive to the value of unrestricted output as in America. The up-to-date American employer never thinks of cutting a piece rate on work once it is fixed.

Here, immediately the employer thinks his men are making too much money, piece rates are cut. Therefore the men practice restriction in order to evade rate cutting. The employer has got to stop that.

However, let me say that the iron and steel trades of this country have acted upon American principles. The rates once fixed have never been changed. The result has been that restriction has never been practised, because there is mutual trust and confidence between the employer and his workers.

These three years of war have driven certain conclusions home upon me, and I believe, upon many others, both employer and labor men in this country.

The first of these is that labor must give up its old restrictive attitude. The second is that capital must become willing liberally to remunerate any extra effort and extra exertion on the part of labor. For any modern nation can only

The development of shell and gun output, the great new program for the building of war ships, aeroplanes and merchant vessels, and recruiting for the new armies brought about a great shortage of labor in Great Britain.

reach the maximum amount of wealth and happiness by producing the maximum amount of goods. War experience has opened our eyes to what we can do in Great Britain. We shall not readily forget the lesson.

We realise now that capital must work with labor and labor with capital. There will be no room for strife between these two complementary forces, if we are to succeed in the industrial campaign of tomorrow. And in order to get labor's cordial co-operation, the lessons of this Ministry have to be taken to heart by employers.

Labor must be called into the council of directors of every great firm. Decisions affecting labor must be taken after, not before, discussion with labor's direct representatives of the probable results of such decisions.

I believe that in this country we are, in certain trades at least, on the brink of a splendid new harmony between capital and labor. May the same happy issue be reached in America, when employer and employed have been drawn close together through the fiery ordeal of war.

SEWAGE PURIFICATION BY ELECTRICITY

By C. T.

The uses of electrical energy are so vast that it is little wonder that attention is now being paid to its employment for sewage purification. A process has recently been invented by which crude sewage is passed through a trough, partially fitted with electrodes placed at right angles to the line of flow and connected in parallel with a current of low voltage. The system is based on the theory that sewage containing table salt and other electra is rapidly decomposed by the passage of the current and that caustic soda, nascent chlorine, hydrogen and oxygen are thus evolved. Part of the freed chloride combines with the soda, lime and iron thrown off by the electrodes, and hypochlorites are thus formed, which attack and break up the organic matter. Experimental plants on this system have been provided in several small communities with varying success. Another method has been tried in the borough of Queen, New York, and at the stockyards in Chicago. This system differs from the former by the provision of a paddle between each electrode, the rapid motion thus engendered keeping the sewage constantly agitated and the face of the electrode well secured. To obtain the requisite standard of purification, quantities of lime are added, and engineers are by no means in perfect agreement as to whether it is the lime or the electrolysis which performs the more efficient work of purification. The cost of working this system is unattractive, but it is interesting to learn that steps are being taken to harness electricity for the purpose of sewage disposal, as the subject is one of increasing importance and has not yet been perfectly solved.

A GOOD story is told concerning Commander Locker-Lampson, whose handling of the British armored-car section on the Eastern front during the Austrian-German advance in Galicia called forth such warm praise.

During the height of the Russian retreat, when our allies were streaming away eastward, one of his Tommies was overheard enquiring somewhat anxiously of another who were our rearguard.

"Those who have the worst horses, I should say," gruffly answered the man addressed, gazing with ill-concealed contempt on the fleeing Russian cavalry.

WASTE OF MONEY ON PARLIAMENT BUILDINGS

Charge That American Plumbing Will Cost 150 Per Cent. More Than Superior Canadian Installation.

The business-like administration of Canada's national affairs has been one of the demands which THE FINANCIAL POST has been persistently making upon the Government at Ottawa. This demand has been emphasized since the outbreak of the war, and the recognition of the increasing necessity for careful handling of the public monies. It is high time that the heads of the government departments realized that public funds should not be squandered, but spent with the same regard for dollar-for-dollar value that would characterize private business. The national call for thrift does not ring true when there are evidences of extravagant and wasteful expenditure by public representatives who should be setting a good example to the people.

A flagrant example of reckless expenditure without regard for value received has been brought to our attention. This has to do with the expenditures on the new Parliament Buildings, and concerns the plumbing contract. Although the amount of money involved may not be considered great in relation to the proportion of the whole undertaking, there are some important principles involved.

Information regarding the matter has been supplied to THE FINANCIAL POST by E. Newsome, editor of Sanitary Engineer, and a competent authority on such matters. Not only does he contend that the system it is proposed to instal in the new Parliament Buildings is more than twice as costly as necessary, but he makes the point that the cheaper system is much superior. Further, and here is a point for Canadian contractors and the Canadian people to consider, the expensive, inefficient system which it is proposed to instal, is an American system, while the cheaper and efficient system being passed over would mean that the money would be spent in Canada. We give Mr. Newsome's views on the matter as follows:

The material being called for in the government specifications is not the best or most practical to use for a sanitary plumbing installation. The soil, waste and drain pipe required is what is known as "extra heavy wrought iron galvanized pipe." It has been proved time and time again that "wrought iron pipe" is not the best material for the purpose although it costs as high as 150 per cent. more than material which has withstood the ravages of time for 250 years or more.

The price of "extra heavy wrought iron galvanized pipe," the size required for all the soil, waste and vent stacks, is worth wholesale at present time, $198.64 per 100 feet. Then special weight fittings, of a special bore, will also cost an outrageous price. Extra heavy cast iron soil pipe and fittings cost only $81.00 per 100 ft.

Regular cast iron soil pipe has been in use for over 80 years and has been found as free from defects, under various tests as it was when installed. In New York the Old Astor Hotel was pulled down not long ago, and cast iron soil pipe was removed after being in use for 80 years, just as good as new.

In contrast at the City Hall, Chicago, wrought iron pipe is in a dreadfully corroded condition and has only been in use for about 10 years.

The Waldorf-Astoria Hotel, New York, is having considerable trouble with wrought iron pipe—used for soil and waste pipes—corroding and the damages cannot be estimated. Rooms are found to be in an insanitary condition as a direct result of leaking wrought iron pipe, the walls of which are thoroughly broken down by corrosion.

The Board of Health, Chicago, had to request the Pullman Co. of the town of Pullman, Illinois, to tear out wrought iron soil and waste pipes from upwards of 1,000 houses, because of the insanitary condition prevailing as the result of corrosion.

The plumbing inspector at Ottawa a few years ago, had a clause embodied in the plumbing by-laws requiring that all vent pipes if wrought iron, "shall be galvanized." It has yet to be proved that galvanizing will prevent wrought iron from corroding after a certain number of years. One thing is sure, however, and that is that it cannot protect piping at the joints, because that portion has the face of the galvanizing broken and moisture will get in underneath, finally even more active corrosion will take place. Take, for instance, the life of a galvanized range boiler; only about 10 years. They are galvanized. There are no proofs that galvanizing will do better than put a few years on the life of the pipe.

Mr. Newsome has prepared the following detailed figures showing the actual cost of the required pipe and fittings if material made in Canada is used as compared with the extra heavy wrought iron galvanized pipe as called for by the government engineers.

CAST IRON PIPE.

Extra Heavy Cast Iron Pipe.

400	feet, 8 inch	$ 590.00
395	feet, 6 inch	
1,700	feet, 5 inch	
8,600	feet, 4 inch	
2,330	inch, 3 inch	
370	feet, 2 inch	6,248.75

Fittings.

25	Y branches, 8 inch	140.00
16	Y branches, 6 inch	
92	Y branches, 5 inch	
480	Y branches, 4 inch	
100	Y branches, 3 inch	
20	Y branches, 2 inch	891.00
12	8 inch bends	40.00
18	6 inch bends	
30	5 inch bends	
560	4 inch bends	
140	3 inch bends	
35	2 inch bends	
1	6 inch cast iron trap	
34	4 inch cast iron traps	
12	3 inch cast iron traps	605.00
18,000	Caulking lead	2,615.00
1,000	Oakum	170.00
500	gallons Gasoline	160.00
	Total cost	$11,259.75

WROUGHT IRON PIPE.

Extra heavy wrought iron galvanized pipe as called for by government engineers to be used instead of above material (current market price)	25,910.00
Saving on Superior Canadian-made material	$14,650.75

In the foregoing figures it will be noted that full allowance is made for caulking lead, oakum and gasoline required in the installation of the cast iron pipe. However, after estimating the cost of the wrought iron pipe alone, at the present market, there would be a net saving of over $14,000 on the cast pipe, a better job would result and made-in-Canada materials could be used.

This article was first published in "The Financial Post," Sept. 15 issue. It created no small amount of interest in Ottawa and will be followed up if no action is taken to have cast iron pipe installed instead of wrought iron, for the purpose named. It is little short of a crime to see architects and experts (?) overriding the experience and knowledge of practical men at the expense of the public, but the inevitable day of reckoning is coming.

CAUGHT FATHER

The correct use of the English language was a great fad of Professor Wiseman. So when he heard his daughter ask the maid to bring a fresh jug of water, he promptly reprimanded her. "You should have said 'a jug of fresh water,' my dear," he told her. An hour or so later he remarked to his wife: "I really think that that picture would show to better advantage if you were to hang it over the clock." "Please bear in mind, father," said his daughter, "that if it were hung over the clock we should not be able to see the time. No doubt you mean to say above the clock."

GOT THE WRONG DOPE

"Look here, I bought a bottle of your hair restorer last night, and all its done is to raise these big lumps on my head."

"My gracious!" said the beauty doctor; "we must have sold you a bottle of bust developer by mistake."

Importance of Humidity to Health

Being the First of a Number of Articles Showing the How and Why of Humidity — Sanitary Engineers Should Read These Articles and Thereby Profit Much.

Written specially for "Sanitary Engineer" by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

A TITLE for this short series of articles that by reading along somewhat similar lines at first suggested itself was "The Physical, Psychological and Physiological Aspects of Humidity in its Relation to Heating." Done in large capitals such a title would occupy *some* space and with paper at its present price this euphonious combination was discarded for a more modest one.

But if the importance of a subject is to be determined by the length of its title then the discarded title was not a whit too long. That at least is what a growing number of our scientists and engineers interested in heating problems from a health standpoint are trying to tell us and upon investigation one cannot but be convinced that the facts bear them out in the main. Of course, as in nearly everything, there are, no doubt, extremists and faddists on this subject of humidity; some of their statements and advice may stand a certain amount of criticism, though they err as a rule on virtue's side. The writer has in mind one instance in which three different methods were employed at one and the same time in an endeavor to provide a healthful moisture in a large office. Cloths (with one end in pans of water) hanging over steam radiators on which the pans were placed, an electric heater in a large pail of water and a pipe from the boiler of the heating system admitting live steam into the office were incidentally the means of "steaming" the windows, wetting the floor and at times giving a "laundry" effect to the atmosphere. But what a wonderful change from the usually dry and consequently unhealthy atmosphere of most buildings as heated in the winter time. "A house without moisture on the windows is not fit to live in."

The relation between heating and ventilation is now well established—in the theory at least. I suppose all sanitary engineers are prepared to subscribe to the dictum that "one cannot have *really* good heating unless the ventilation is also good, nor good ventilation if the heating is bad." And this is true because the subject of health is receiving in general greater attention. "Not long ago many consumptives were kept in warm, badly ventilated rooms; to-day the treatment prescribed is fresh air and lots of it. In the depth of winter people troubled with this terrible disease are properly wrapped and live and sleep in the pure, fresh air, getting as much sunshine as possible. Sleeping porches are becoming as necessary in the modern house as is a kitchen."

If there be any who doubt the important relation between heating and ventilation, the following facts may impress them as they impressed me. We are told that the Indians of our great West are quite rapidly decreasing in numbers due to that great white plague, consumption. Who should be healthier than the Indians? But their attempt to adopt the white man's ways has been disastrous. I have had the experience of sleeping in an Indian tepee and in an Indian house. From Fig. 2 one can gather how by means of a fire and skins stretched around the tepee and on the floor the Indian could keep comfortably warm. To provide draft for the central fire it was necessary to have air inlets of some sort. Incidentally this fortunately provided ventilation as well. When the Indian became "civilized" and learned how to build a log house he considered only (as many architects and builders apparently still do) the heating proposition. All the chinks and openings of these generally very small houses are filled with moss or clay and everything made "snug." The resultant lack of adequate provision for ventilation has worked great disaster to the Indian formerly accustomed to the best of ventilation and not yet "fortunate" enough like some of the foreign element in our crowded cities—to a less extent ourselves—to become acclimatized to what really are unhealthy conditions. In passing it might be mentioned that we are more "fortunate," too, than the Indian in that our houses in which no provision is made for ventilation are often of the cheaper class of house; there are many "chinks" which the builder, unlike the Indian, has left open. Through such chinks, from around windows and doors, the average house is ventilated, not truly scientifically, and certainly not just always as the householder would wish, such ventilation being a matter outside his control.

CONCLUSIONS

The points discussed in this article might be briefly enumerated:

1. **The problems of Heating and Ventilating are inseparably related.**
2. **Proper Ventilation means not only the supplying of fresh air, but also of sufficiently moist air.**
3. **For health and comfort, it is not the actual amount of moisture in the air, but the relative amount (the ratio of what moisture the air contains to what it could contain), that is the important factor.**

A—Warm air can hold more moisture than cool air. To keep a desirable relative amount of humidity (about 60%), requires more moisture in a warm than in a cool atmosphere.

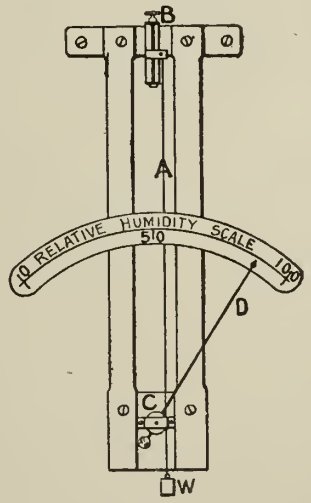


FIG 1.—A HAIR HYGROMETER

Of the many who admit the necessity of providing ventilation in any scheme of heating it would seem that few have realized the importance of the amount of moisture to be provided in the fresh air supply. If it be true that heating and ventilating have been only recently recognized as being inseparably connected, it is equally true that only much more recently have the two aspects of ventilation, fresh and sufficiently moist air, been recognized as also equally closely allied from the standpoint of health and comfort. Our climatic conditions in Canada make it a sanitary necessity that our homes in the winter be artificially provided with *warm, moist fresh* air. To explain why the air should be moist, but especially how this may be accomplished, are the objects of these articles.

For a better understanding of what is to come some few physical properties of air and moisture are here set down. Humidity, meaning dampness or moisture, is a word commonly used with reference to the amount of water vapor present in the air. Now water vapor is exactly the same thing as steam, but is the term generally applied when the temperatures are low. It is a well known fact that at sea level all water must turn to steam if a temperature of 212 degrees be reached, but steam, on the other hand, can exist at lower temperatures, even far below zero. However, the lower the temperature, the less is the weight of steam; or the cooler the air the less is the amount of moisture or steam it can retain. When air at any temperature contains all the moisture it is capable of holding it is said to be saturated; if cooled, some of the water vapor

will be condensed and deposited as drops of water as in the phenomenon of the formation of dew, a familiar nightly occurrence.

The actual amount of moisture in a certain volume of air is best expressed in terms of *absolute humidity*, or the number of grains of moisture in each cubic foot of air. However, as we generally use the term humidity we really have in mind

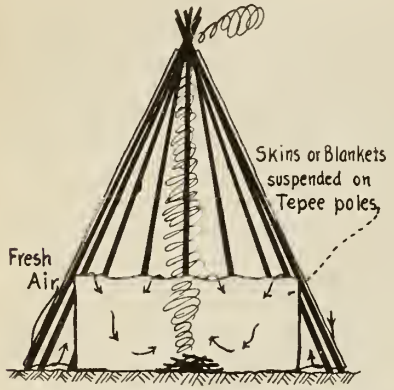


FIG. 2—SECTION OF INDIAN TEPEE ILLUSTRATING PRIMITIVE HEATING AND VENTILATING

relative humidity, or the ratio (expressed as a percentage) of the amount of moisture present to the amount that air could hold if it were saturated.

Whatever be the temperature of the air it has been found that for comfort and health the relative humidity should remain practically constant—say, 60%, like that of a May or June day, although here authorities differ. What affects our feelings is the relative, not the absolute humidity. For example, air at zero degrees Fahrenheit would be saturated if it contained 0.56 grains of water vapor per cubic foot and the atmosphere would affect us as very moist. This same amount of moisture at 60 degrees would hardly be noticeable and the air would feel very dry, as it takes 5.74 grains of moisture to saturate the air at this temperature.

The effect of moisture on many, in fact nearly all, organic substances is to increase their dimensions as in the case of wood, wool, hair, whalebone, catgut,

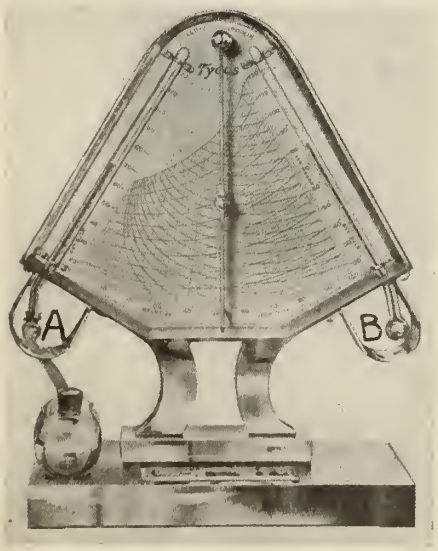


Fig. 3.

grasses, etc. Here again it has been found that any change is dependent on relative and not absolute humidity. The relative humidity of the atmosphere out-of-doors and indoors does not vary greatly by the change of temperature. It is when we decrease the relative humidity indoors by artifically increasing the heat, without also increasing the amount of moisture, that our furniture is adversely affected, the wood contracting. It is on this same principle that the so-called hair hygrometer, correctly termed a hygrometer, depends, a hair increasing or diminishing in length approximately in proportion to the relative amount of moisture in the air. Hence the relative humidity can be read directly without the calculation generally required with other more scientific hygrometers, or instruments for ascertaining the humidity or state of the atmosphere as to moisture.

A good hair hygrometer, while not accurate enough for many scientific purposes will serve, as a rule, to indicate the relative humidity of buildings for heating and ventilating purposes. The hygrometer shown in Fig. 1 consists of a hair (a) from which the oil has been extracted fastened by an adjustable mechanism; (b) to a suitable frame. The lower part of the hair from which a weight (w) is suspended is wound on a cylinder (c) which is free to revolve and which carries a balanced pointer (d). The hair increases (sending pointer to the right) or diminishes (sending pointer to the left) in length in proportion to the relative amount of moisture in the air.

Of the more scientific instruments for measuring humidity three common types might be very briefly considered, the Condensing or Dew-Point Hygrometer, the Chemical Hygrometer and the Wet Bulb Thermometer or Psychrometer. In the Condensing Hygrometer the thing directly observed is the dew point or the temperature at which the atmospheric moisture begins to condense. The Chemical Hygrometer measures the absolute humidity, is the most accurate but is not adapted for ordinary use.

The Psychrometer on account of its convenience is now generally used, though its accuracy is not always what might be desired. It consists of a dry bulb and wet bulb thermometer placed side by side. The evaporation of water from the "wet" bulb causes this thermometer to register a lower temperature than that of the surrounding air as indicated on the ordinary thermometer. The difference of temperatures read from the two thermometers is an indication of the relative humidity.

In none of the hygrometers (except the hair hygrometer) just described is the relative humidity directly found. As this is the important thing to be known for heating and ventilating purposes, various movable scales or other devices have been used to determine the relative humidity without calculation. The most convenient of such instruments or devices is probably the "Hygrodeik" shown in Fig. 3. The relative humidity may be read directly from the chart (located between the thermometers) by means of the dial.

IMPROVEMENTS TO NO. 1 C. & L. FIRE POT

The Clayton & Lambert Mfg. Co., Detroit, Mich., have recently added two important improvements to their No. 1 gasoline fire pot, both of which are shown in the accompanying illustration, which they claim add greatly to the service and efficiency of this popular fire pot.

These improvements consist of a dustproof cap or filler plug for the funnel used for filling the tank, which prevents dirt from getting into the gasoline; also a cushion protection band around the bottom of the tank, which serves to protect the fire pot if it is roughly handled.

The No. 1 fire pot has been on the market some years. The tank is made of seamless drawn steel and the bottom and fittings are welded in, which makes it practically indestructible. It is claimed that the improved construction of the burner represents the highest development of generating power and heat efficiency from gasoline, and saves the fuel to a remarkable degree, producing an ideal blue flame entirely free from smoke easily regulated, giving satisfactory results under all reasonable conditions, including windy or cold weather.

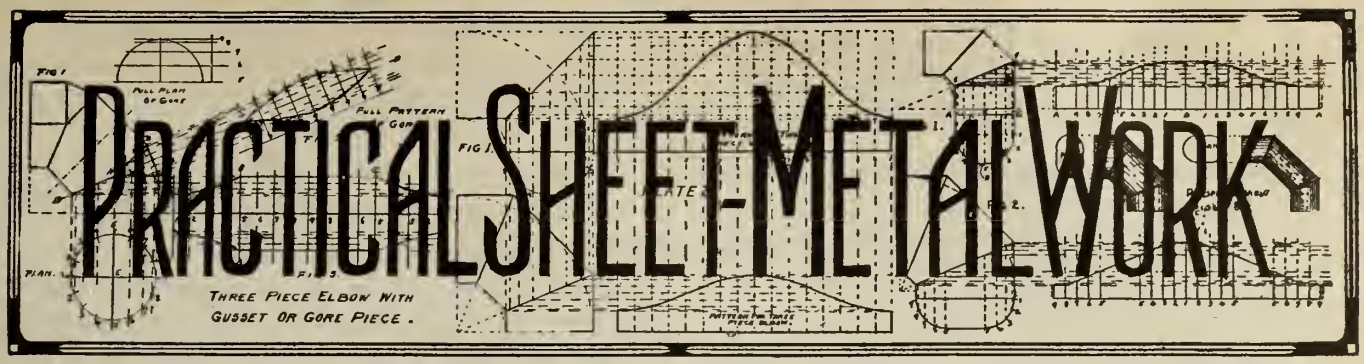


Improved No. 1 Gasoline Fire Pot.

The burner is swiveled, which permits moving the flame up or down. A pair of twelve-pound soldering coppers can be heated and a pot of lead or solder melted at the same time. The top section can be removed, thus producing an open fire.

A catalogue showing the different styles of gasoline and kerosene fire pots and torches made by this company will be mailed upon request.

SEVERAL hundred guns were irrevocably lost to the British army as the result of a recent strike, according to Sir L. Worthington Evans, one of the parliamentary secretaries of the Ministry of Munitions, in a speech at Manchester, Eng., July 6. One man's grievance, he said, is almost insignificant compared with the result of stopping the whole train of war work. In a late offensive in France, more shells were fired than in the 18 weeks of the Somme offensive. On one type of shell alone, 500,000 were fired in one week. A strike in April lost to the country between 150 and 200 airplanes.



BY THOMAS STANFIELD

AN article appeared some time ago which took up the question of the size of chimneys and the insulation of pipes and furnaces, the importance of which is without question. The next problems on warm air furnace construction, or shall we say warm air heating systems, are those of humidity, and fresh air supply, as well as a general understanding as to the true principles which should govern such a system.

Many manufacturers of warm air heating furnaces attach importance to the large fire pot, large combustion chambers, and extensive heating surface. Such may or may not be desirable according to the varying conditions of the different furnaces. The main object to be achieved is circulation of air.

A few years ago the writer was called in to examine several buildings in which warm air furnaces had been installed. The occupants could not get from the furnace the heat that it was felt should be obtained. Upon looking into these installations, it was found that the chief trouble lay in the fact that only about 50 per cent. of the cold air required to create proper circulation had been provided, and the heat was being confined too long in the interior of the furnace.

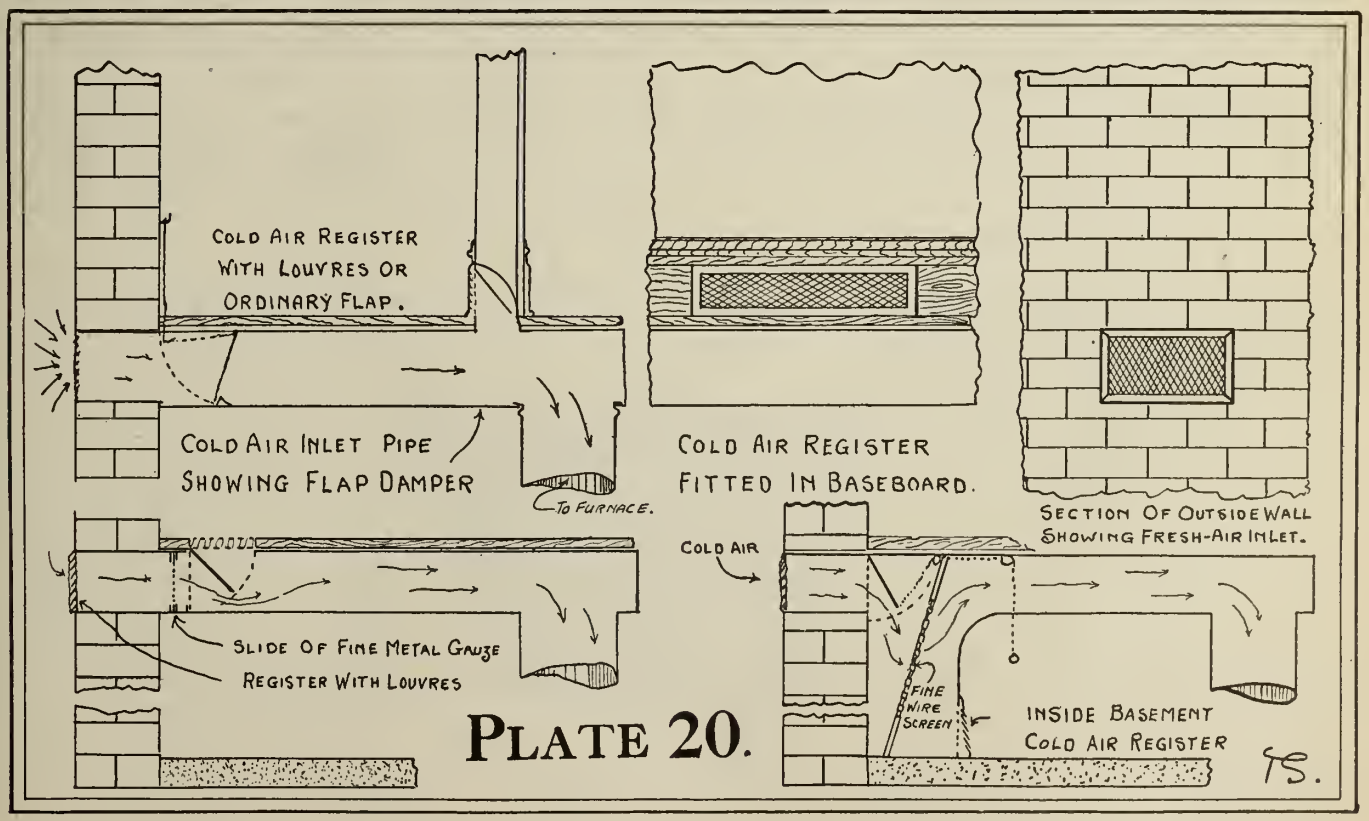
Then the furnace was also fitted up with a poor casing. In one case the occupant had cut a hole through the floor of the hall and inserted a register with a fine screen under it, and the warm air from the basement improved matters wonderfully though such a method is not by any means to be advocated. The main solution is to provide sufficient cold air and this can be done in two ways.

First by placing cold air registers either flat on the floor, or in the base-

(Continued on page 34.)

Number of Rooms to be heated	Size of pipes taken from top of furnaces.	Size of warm air registers.	Cubic area of pipes.	Cubic area of registers.	Size and number of cold air ducts.
			in. in.		
6	2.8 inch dia.	2. 8 x 12	each 50 100	192 in.	2.18 x 24
	2.10 inch dia.	2.10 x 16	" 76 156	320 in.	Containing
	2.12 inch dia.	2.14 x 16	" 113 226	448 in.	402 cu. ins.
			502	960 in.	

A safe rule is to allow one-third the number of cold air outlets or ducts of the number of warm air pipes, containing a cubic area of 25 per cent. less than the area of pipes taken from top of furnace.



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WROUGHT IRON vs. CAST IRON FOR SOIL WASTE AND DRAINAGE

OUR readers no doubt were interested in the articles appearing in SANITARY ENGINEER last issue which referred to the specifications requiring the use of extra heavy wrought iron galvanized pipe to be used for soil waste and drainage piping in the new Parliament Buildings at Ottawa.

We have been informed that the manufacturers of wrought iron pipe resent the statements made regarding the unfitness of such material for the purpose named, but that is only to be expected, when we consider that they are interested in selling their products.

It is, however, painful to see how men can almost bring themselves to believe they are right in such contentions when all along the line practical, unbiased opinions prove and are proving every day, the very reverse.

One self-constituted authority says that zinc is indestructible when placed on wrought iron pipe, despite the fact that there are hundreds of thousands of feet of pipe at this present time in a state of disintegration all over America. It is there to be seen, and surely seeing is believing.

In our next issue we will publish still further evidence of the unfitness of wrought iron pipe for the purpose we have named, and in this connection we wish to call upon every plumber and sanitary engineer in Canada to stand on his dignity and refuse to be at the beck and call of every Tom, Dick or Harry that comes along.

There is a chance here and now for our craft to show the public that we are on the side of science, and safety, that we are out to prove that the contentions of practical men must predominate.

We must not, however, be so hide-bound as to refuse to use wrought iron pipe in certain places where it may be preferable to cast iron. We must not be swayed by theory. Time and practical usage alone are the only bases upon which sanitary engineers can rely, and so far time has proved that wrought iron pipe is not yet the best or even as good under any condition, for the conveying of soil and waste from buildings.

THE PAPER THAT IS NOT WANTED

THE Montreal *Daily Mail* has suspended. It is a class of paper which should never have come into existence. It has been financed to a great extent —if not entirely—by contributions from Montreal financiers. When will financiers learn that such a policy is very unfair to the legitimate old-established publications? They create unnecessary and often nasty competition and are seldom successful. In most cases where a rich man gives money to establish or help a newspaper it can be put down to vanity, or to serve some ulterior object. There are, of course, some exceptions. Sir Joseph Flavelle sunk nearly half a million trying to put The Toronto *News* on its feet. He had the money made in a fortunate investment outside of his business. He decided to give that money for the public good, and he tried—with the aid of an equally public-spirited man, Sir John Willison—to make The *News* a University for the masses, and it was conducted strictly on these lines. The same cannot be said of the Montreal *Daily Mail*.

It is rather an interesting coincidence, that M. E. Nicholls, the promoter and conductor of The *Mail* prepared a report on the Newspaper Postal Situation in Canada. He singled out trade and technical papers for attack, saying they should not be allowed newspaper rates as they were of no public service. When the public were telling Mr. Nicholls his spoon-fed product was not wanted, the public of Canada, the United States, Great Britain, Australia and India, as represented by their Governments were calling on the trade and technical editors and showing them that their papers were indispensable in these times of stress.

THE VALUE OF THE TRADE PRESS

IN A circular letter to the Trade Press in general, James H. Collins, who is in charge of the publicity bureau at Washington, D.C., for aiding the Government Food Conservation campaign, says:—

"I have been for years a close reader of trade and technical journals. I have the greatest possible respect for their character, enterprise and usefulness. I believe American business to-day is very largely influenced and developed by its fine trade press; and I feel, in this new war task which we are undertaking, that the co-operation of the trade and technical press will be, not only quick and hearty, but of great practical usefulness along broad and probably unforeseen lines."

Steam Traps, and How They Operate

Heating Engineers Will be Interested in This Series of Articles Which, After Describing Some of the Most Effective Radiator Traps, and the Tilt Trap, Will Deal With the Condensation Return Trap, Etc.

STEAM TRAPS.—IV.

THE various types of traps already described in these articles have all been characterized by a feature which in the case of float-operated valves may ultimately give trouble if the construction be not of the highest class. This feature is the presence of steam pressure in the space occupied by the valve gear, etc., and in the case of float-operated valves working under high pressure, the possibilities of trouble due to leaky or collapsed floats are naturally greater than with bucket or expansion traps. In addition to this, the necessity of making the trap body strong enough to stand high pressures calls for increased weight and reinforcement when box-shaped bodies are used.



FIG. 20. SECTIONAL VIEW OF ELLIOT STEAM TRAP SHOWING VAPOR VENT CONTROLLED BY FLOAT.

Elliott Steam Trap

This trap belongs to that group of float-operated traps in which the float and operating mechanism are on the atmospheric side of the shut-off valve and are not subject to full steam pressure, the only pressure existing being that necessary to elevate the water from the level in the trap to the outlet, and as this distance is only a few inches, the pressure required may be disregarded. A sectional view of the trap in operation is given in Fig. 20, and an outside view of a Class A trap is shown in Fig. 21, this being suited for pressures up to 125 lbs. per sq. in. and adapted for automatically draining water of condensation from steam pipes, steam coils, radiators and for general purposes.

The water in the line leading to the trap has a temperature of within a few degrees of the temperature of the steam at the same pressure, and as the water enters the trap where there is practically no pressure, its temperature immediately drops to about 212 degs. F., as that is the highest temperature water will carry at atmospheric pressure. With this drop in temperature, the water parts with what may be termed its surplus heat in the form of a vapor arising from re-evaporation of a portion of the water. The slight pressure in the trap is caused by this vapor, and it is this pressure which forces the water up the ejectment pipe and through the outlet of the trap. It is obvious that the amount of vapor formed from re-evaporation of the water will increase in proportion to the amount of water entering the trap, and the excess vapor is permitted to escape into the discharge outlet through a vent opening in the top of the ejectment pipe, this opening being automatically increased or decreased in proportion to the amount of water entering.

Referring to Fig. 20, let it be assumed that the trap is in service with the inlet valve party open and the water level as shown. The slight pressure in the trap forces the water up the ejectment pipe and through the outlet, as indicated by the arrows. As long as the water enters at a uniform rate, the water level will remain at the same point, and the excess vapor will escape through the vent openings.



FIG. 21. EXTERIOR OF ELLIOT CLASS "A" STEAM TRAP.

The inlet valve never actually closes, for a groove is cut in it to permit the water to trickle into the trap and begin to raise the float. Steam will not escape through this groove as there is always enough condensation in saturated steam pipe lines to insure the valve being sealed with at least a small amount of water. The valve is of the ball type, and both it and the valve-seat bushing are made of a special metal which experiment has demonstrated as being best able to resist the cutting action of hot water.

No live steam can escape through the trap, because, should it happen that all the condensed water be drained from the line and steam allowed to enter the trap, enough pressure would be created to immediately lower the water level and close the valve, which would remain closed until fresh condensation collected in the line and passed slowly through the valve to add to the water in the trap.

Three classes of this trap are made "A" for pressure under 125 lbs., "B" for pressures over 125 lbs., and "C," which is of the elevating type. Class "B" traps can be fitted with a blow-through attachment for draining engine jackets, or any desired heating system. These traps are made by the Elliott Company, Pittsburgh.

Anderson Steam Traps

In the model D trap of this type, every effort of the makers has been directed toward producing a trap which will give satisfactory service when used in connection with any apparatus using steam at pressures varying from 250 lbs. per sq. in. to gravity, and also where there is condensation in air lines. This trap, illustrated in Figs. 22 and 23, works continuously and automatically; the valve and seat are sealed with at least three inches of water at all times, thus eliminating the possibility of live steam escaping with the condensation.

One of the prominent features is the ease with which the valve and seat can be changed to accommodate the varying pressures at which it may be desired to operate the trap. Should the trap in use be fitted to work from 150 lbs, and under, this can be accomplished by inserting a valve and seat suitable

for the desired pressure, an operation which can be performed in a few minutes and without removing the trap from the line. The body of the trap is of suitable shape to withstand pressure stresses, and has removable perforated metal strainer arranged at the inlet which protects the valve and seat against scale packing and other sediment. The gauge glass fittings as well as air and drain cocks are also mounted on the body.

The valve and its operating mechanism are mounted on a flanged globular casting with by-pass operating handle and removable cover through which the valve can be reached. All gaskets are set into counterbored recesses and all bolt strains are brought to bear directly over the packing joints which eliminates any possibility of their blowing out.

The trap as shown in Fig. 22 is piped up correctly for all ordinary purposes where condensation is discharged on a level with or below the outlet of the trap, the drain, or discharge line, being connected to the side of the trap head which is most convenient. Two standard valve openings are obtainable, viz., from 150 lbs. down to 30 lbs., and from 30 lbs. down. For pressures below 10 lbs. and over 150 lbs., special openings are furnished.

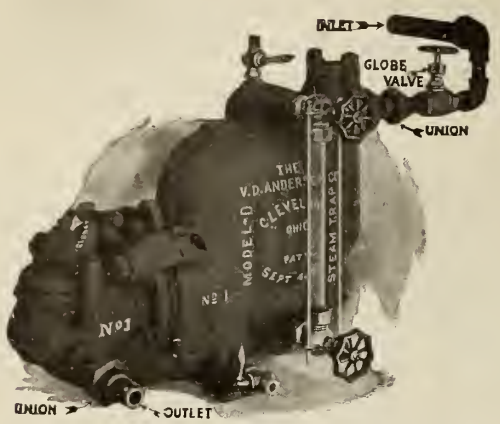


FIG. 22. ANDERSON MODEL "D" TRAP PIPED FOR ORDINARY SERVICE.

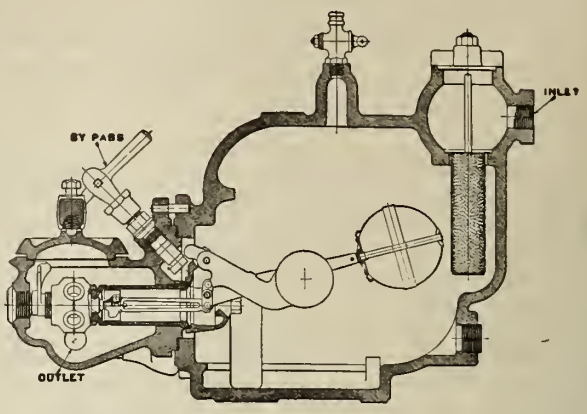


FIG. 23. SHOWING STRAINER, VALVE AND BY-PASS OF ANDERSON TRAP.

Anderson Junior Steam Trap

This apparatus is made especially for use on sterilizers, paper dryers, radiators, or any place where a steam trap of small capacity is required. It has no by-pass or gauge glass and is arranged as shown in Fig. 24, for use on ordinary steam lines. The interior construction is shown in Fig. 25, the mechanism being arranged on the unit principle, as in the larger model D trap, both of these traps being the product of the V. D. Anderson Co., Cleveland, O.



FIG. 24. ANDERSON'S JUNIOR STEAM TRAP.

Marck Therm Steam Trap

The apparatus illustrated in Fig. 26 is an example of the thermostatic type, which depends on the expansion of a solid liquid, or gaseous body for a means of operating the valve. The Marck Therm steam trap is designed for use on the discharge end of low-pressure steam using apparatus, and may be described as an automatic valve which is always open at temperatures below 212 degs. F., and always closed at higher temperatures. It is particularly adapted for draining radiators and heating coils, whistles, sirens, and other steam apparatus on vessels, and also such items as steam cooking equipment, etc., where low pressure steam is used.

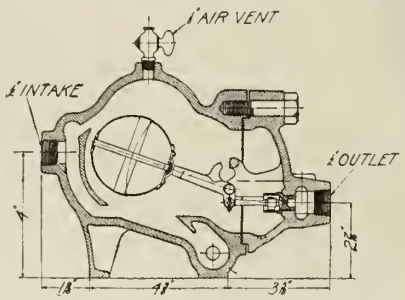


FIG. 25. SECTIONAL VIEW OF FIG. 24.

The interior of the trap is shown in Fig. 26, from which the simplicity of this type of trap is apparent. The tubular crescent-shaped member A, is filled with a liquid which becomes a gas at 212 degs. F., and is securely sealed against leakage. Valve B and stem C, are guided and supported by block D, while spring E holds tube A in position against adjusting screw F, thereby preventing A from expanding in any other direction than that of valve seat B. This spring, however, has no effect on the action of tube A. An adjusting screw F enables tube A to be moved in either direction to insure the proper seating of the valve.

As long as the temperature surrounding the tube remains below 212 degs., the liquid in the tube remains inert, and the valve is open as set. When steam is first turned on, the trap being open, all air and water of condensation and dirt are blown through until, when steam attempts to pass, the temperature rises above 212 degs. causing the tube to expand and seat the valve. The trap now remains closed until the temperature drops below 212 degs., when the tube contracts and opens the valve to allow passage of air, water, etc., until steam again raises the temperature. E. F. Houghton & Co., Philadelphia, are the makers of this trap.

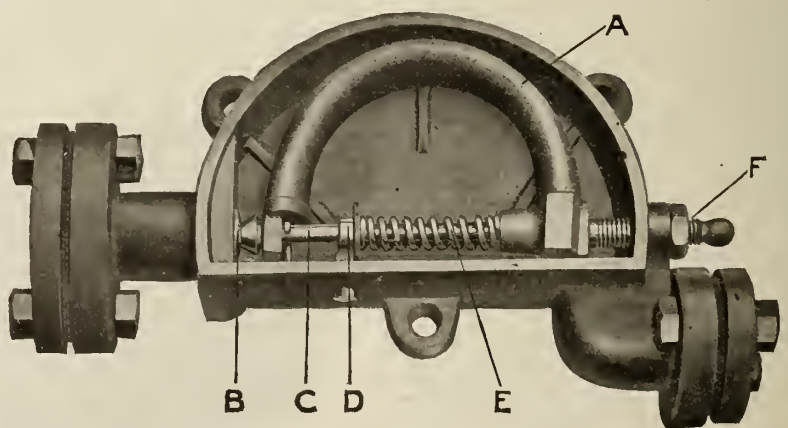


FIG. 26. SECTIONAL VIEW OF MARCK THERM STEAM TRAP.

Main House Trap and Breather Problem

No Subject Has Proved More Interesting Than That of the Main House Trap and Breather—We Publish Herewith a Few of the Many Replies We Have Received in Answer to a Number of Letters Recently Sent Out.

ONE of the problems considered by the American Society of Sanitary Engineering at their convention held in Grand Rapids was that of the main house trap. There were a few who favored it, but only because of the fact that they had their misgivings as to allowing main sewers being ventilated through the pipes that are installed in buildings.

The discussion showed that with the ventilation of sewers, the house trap is no longer necessary, and the time is fast approaching when the society will favor its abolition.

Would Abolish Main House Trap

Frank R. King, Chief Plumbing Inspector for the State of Wisconsin, said: "In Madison, the capital city of Wisconsin, there are practically no main house traps in use, the effect of sewer air on the drainage system is less destructive than in Milwaukee. Where the main house trap is in use, and where I have had many years experience. The main house trap is a cause of constant stoppage, and it is often removed by the plumber. In Wisconsin the use of the main house trap is optional. The dead end of a piping system is where corrosive effect is most active, and such construction should be avoided

"Every main house trap is practically a dead end from the main sewer branch to the sewer end of the trap."

Main House Trap a Nuisance

T. J. Claffy, Assistant Chief Plumbing Inspector, Chicago: "The volumes of proceedings contain preponderating evidence that the main house trap is a nuisance. In some Canadian cities the main house trap has prevented the freezing of horizontal drain pipes. In Great Britain investigation of the Royal Sanitary Institute concludes that the main house trap is a nuisance. It has been demonstrated that the gas generated in the sewer is less corrosive than that in the house drainage system which is more concentrated and effective. This is probably due to the better ventilation of the sewers. If any one wants to study this matter, they should get the volumes of proceedings and refer to them frequently."

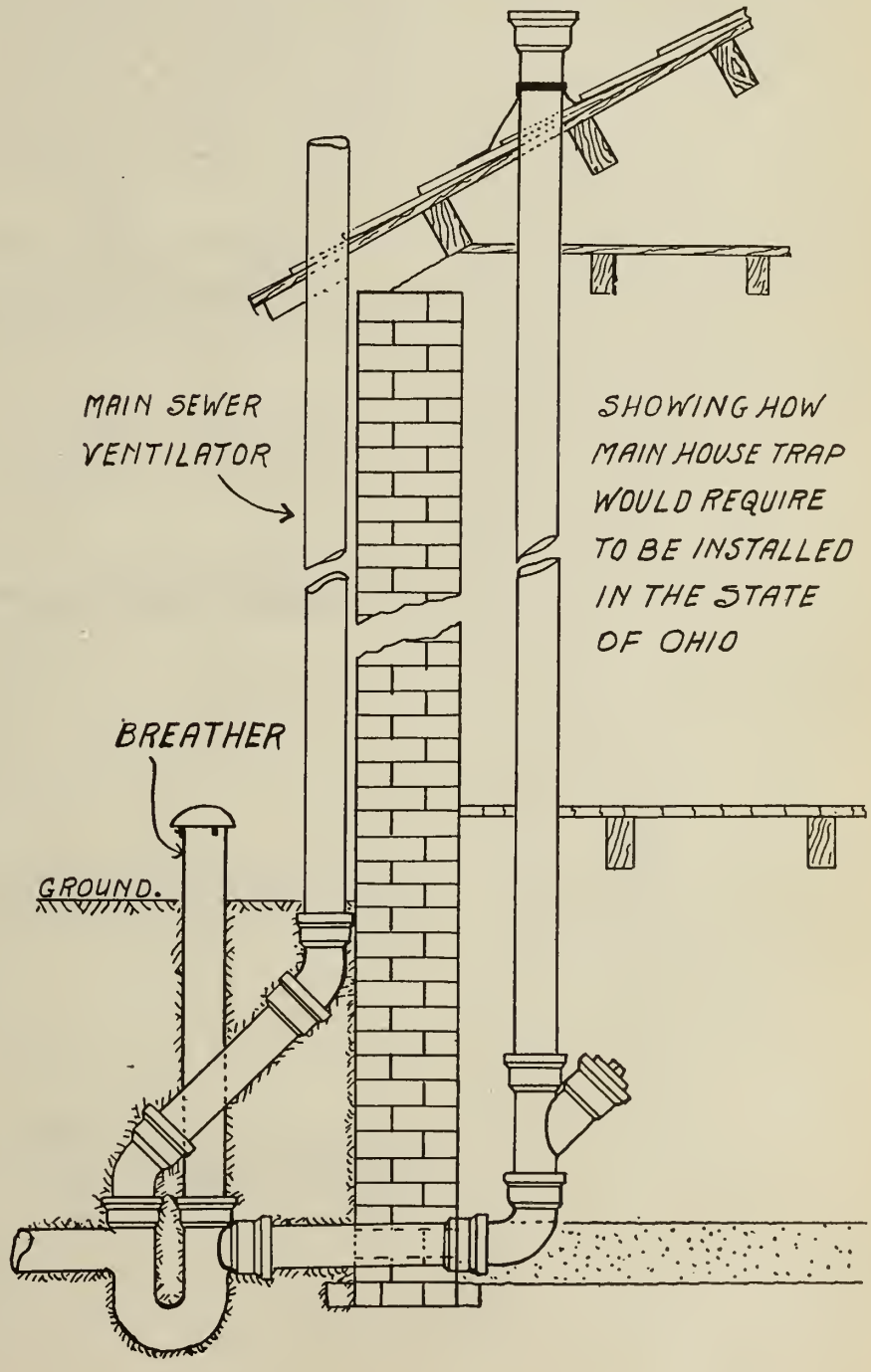
Favors Main House Trap Under Certain Conditions

C. Rainger, Cleveland: "I want to say a few words in defence of an old friend, the main house trap. In use and method of connection should be controlled by climatic conditions. In Cleveland a main house trap is permitted if a vent pipe is carried from each side of the trap up through the building to the roof."

(Continued on page 34.)

EDITOR'S NOTE.

This article is based upon the opinions of men in other lands. In England the most up-to-date thinkers have condemned the intercepting trap. In the United States it appears to be only favored by men of the old guard, located in cities that are cursed with poorly laid out sewers. In some cities it is permitted, but conditions would almost prohibit its use. (See accompanying drawing).



Some Elements of Sanitary Plumbing

An Address Delivered by Harry Y. Carson, of the Central Foundry Co., at a Meeting of the New Jersey Society of Sanitary Engineers, Which Was Illustrated by Steriopticon Lantern Slides.

IT is indeed a pleasure, my friends, to be here to-night and talk with you about sanitation; but to be frank with you, I was dubious about being able to prepare (upon the short notice given me by your secretary) an adequate talk to fully justify the great honor of appearing on the programme of this society. The fact that you have called upon me reminds me of a story about a little girl who went with her mother to the seashore; and the seashore was a sight the little girl had never seen before. She got a bottle full of the waves and took it home with her. When she got there, she said: "Mother, I brought home something alive," and she poured out the contents of her bottle. When it was all poured out, she began to cry: "Oh, mother, it's all dies; the waves died on the way home."

That is very much my own condition—like the waves—when I try to express to you my thoughts of the great work that is being done, by such organizations and such men as are here gathered, to add what they can to practical sanitation. It is indeed fit that the practical man and the theoretical man should come together and exchange views regarding plumbing work and other important subjects relating to modern sanitation. This society offers these opportunities.

The elements of sanitary plumbing are—Good materials, good workmanship and good inspection. But chief among these is good material, for this is, in reality, the basis for good workmanship, and good workmanship renders more efficient the inspection of plumbing installations.

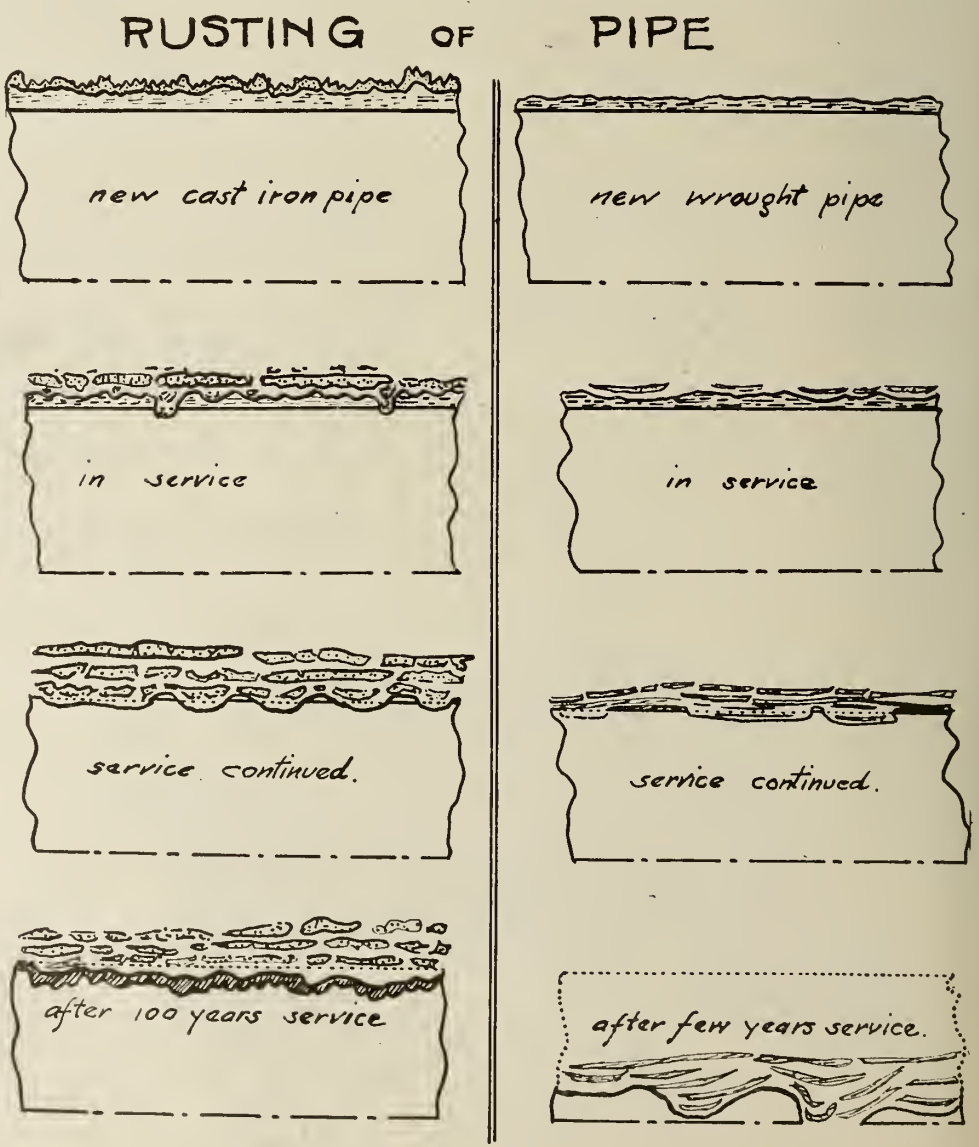
In sanitation the best is none too good. This is because the loss of human life and the loss of human health or comfort is too large a stake for light consideration. Thus we can never have air too pure or too clean, water, or food which is too safe or which is too healthful. Neither can we have plumbing or sewage disposal too carefully planned, or too safe for the general health and welfare of peoples who to-day live in congested districts or who live in rural districts.

The plumbing in modern buildings bears about the same relation to the life of a city as the capillaries carrying life blood to the individual cells or organs in a living being bears to its existence. The piping serves the same purposes as the arteries and veins, and we might consider the living people as the individual units making up a living city. This idea can be carried out ad finitum, and is by no means a wild way of analyzing civil problems as they exist in modernized communities. Pure wholesome water is just as essential to a healthy city as pure, wholesome red blood is to an individual; and it is just as necessary to install sewage purifying plants in a living city as it is to have a pair of lungs and a pair of kidneys in a living individual.

The supply of water is brought to a house, is distributed to the various fixtures, and there, like the blood, serves the dual purpose of supplying the needs of the cells and also of carrying off the waste products discarded by the cells. The fixture trap is the beginning of the sewerage system which, like the great veinal system in a living individual, performs the function of rapidly carrying the waste matters to the places of purification. The sewage after purifying would be pumped back into the water mains in the form of a pure, wholesome effluent after leaving the sewage treatment plants if it were the fact that there was scarcity of water on the surface of the earth. But fortunately we are not often called on to perfect such a high degree of sewage treatment that it can be utilized for drinking purposes; nevertheless we must as a general rule render our sewage pure enough so that when it flows into our rivers or small streams, it is diluted and can be safely handled as a water supply down-stream.

We could easily go on tracing out the wonderful forces of nature which work to maintain a biological balance in our living city, and you would see that each step in the process is really analogous to a similar natural force taking place in a single living organization. In this great cycle of life things balance themselves up if we but give them the chance. We can't short-circuit them and hope to gain a desirable result.

To get back to our main subject, the plumbing system, which we have termed



the capillaries—we have said that these must be carefully put into place; that they must be of good stuff; and that they must be carefully inspected and checked over so that nothing is out of place. And so they must!

The gases emanating from the sewage—the bad blood of the city—is a toxic poison—the foul breath of the community—and it must be vented off into space, there to be wafted about by the wind, absorbed and purified by the atmosphere, and finally restored to harmless ingredients. We must construct traps against the backing up of these poisons; we must so arrange the traps and vents that the poisons are not forced back on to the living cells, and, above all, we must look to the **permanence** of the pipes to insure **long life to the human unit or city cell.**

When we put up a modern building, the waste and vent piping shall be more **permanent** than the building. To accomplish this end the piping must be in good condition when the building is ready to come down.

Experience with wrought pipe installations has been that they cannot be depended on. At Pullman, Illinois, where the Durham method of plumbing was used in more than a thousand one and two family houses in 1881-5, the wrought iron pipe was found to be in such bad shape by 1900 that the Chicago Board of Health requested the Pullman Co., the owners of the town, to protect the health of their employees by tearing out the wrought iron installations and replacing with a permanent system. The wisdom of this change is manifest by the great decrease since that time in preventable disease in Pullman.

The wrought iron pipe is susceptible to the corrosive influence of the sewage gases, and the effect is manifest by a peculiar flaking off of rust scales on the interior of the pipe. The corrosive action takes place fastest in places where the gases have a chance to become concentrated. For instance, the lines showing the most rapid deterioration are "dead ends," or it may be that a wrought iron vent will choke up with scale and thus create "dead ends" in both the horizontal soil and vent branches.

When this happens, the top portion of one of the pipes or a nipple gives out and the noxious gases then flow directly into the building. At the Waldorf-Astoria Hotel and other buildings in New York City, where a good-sized fortune is now being spent by the owners in tearing out the wrought iron and steel piping wasted away by the action of sewage gases, the same thing is manifesting itself as at Pullman. The main vertical soil lines are for the most part in fair shape, but many of the horizontal lines, which have virtually been "dead ends"—due to scaling action going on inside the vents—are practically entirely wasted away, as shown by the samples coming from that building.

These facts stand out as a universal criticism of those systems of plumbing which are not as permanent as the building itself.

It is safe to assume an expected life for modern buildings at 100 years. Wrought iron pipe and wrought steel pipe have given evidence of a life ranging from 10 to 25 years—this range depending on the degree or severity of the prevailing conditions existing in the house drainage system, **and is not due to any difference in the life of wrought steel and wrought iron.**

Brass, lead and cast iron materials are the most permanent materials used in the plumbing art.

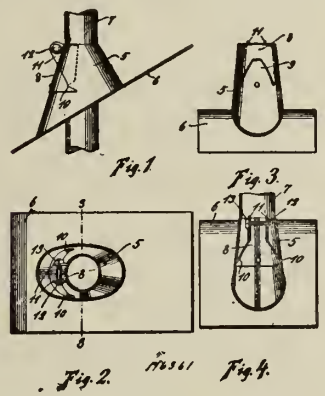
When brass, lead and cast iron are put together as a drainage system of plumbing within the walls of a modern building—the work being done by skilled mechanics and the system carefully checked by a good inspector—then, and then only, we shall have come into possession of the elements of sanitary plumbing practice.

New Canadian Patents

No. 176,361.

Charles Augustus Overton and Jesse C. Cholvin, assignee of a half interest, both of Spokane, Washington, U.S.A., 10th April, 1917; 6 years. Filed 5th February, 1917. Receipt No. 275,344.

Claim.—1. A proof joint comprising a flexible sleeve having a side recess and a



No. 176,361. Roof Joint.

tongue extending upward from the bottom of the recess, a flexible tongue secured to the sleeve to cover the recess, said tongue lapping the inner surface of the sleeve at opposite sides of the recess and also lapping the first-mentioned tongue, and means for contracting the aforesaid lapping parts together.

No. 176,535.

William B. Royer, Baltimore, Maryland, U.S.A., 24th April, 1917; 6 years. Filed 19th February, 1917. Receipt No. 275,938.

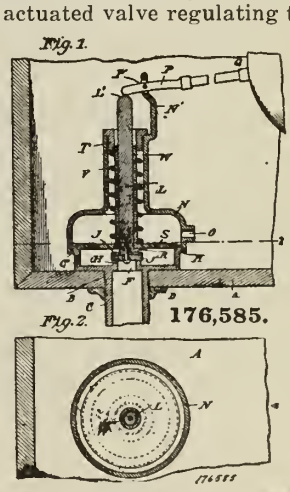
Claim.—1. A silent inlet valve for closet tanks, comprising an inlet pipe for attachment to a pipe, a chamber communicating with said pipe, a float actuated valve regulating the communicating opening between the pipe and chamber, and a spring-pressed pressure regulating member independent of the valve.

2. A silent inlet valve for closet tanks, comprising an inlet pipe for attachment to a pipe, a chamber communicating with said pipe, a casing fitted to the wall of said chamber and having an exit opening, a float actuated valve regulating the communicating opening between the pipe and chamber, and a spring-pressed pressure member independent of the valve and regulating the passage of water between said chamber and casing.

3. A silent inlet valve for closet tanks, comprising an inlet pipe for attachment to a pipe, a chamber communicating with said pipe, a casing fitted to the wall of said chamber and having an exit opening, a float actuated valve regulating the communicating opening between the pipe and chamber, a spring-pressed pressure chamber adapted to seat upon the wall of said chamber and adapted to offset pressure of the water which is fed into the chamber.

4. A silent inlet valve for closet tanks comprising an inlet pipe for attachment to a pipe, a chamber communicating with said pipe, a casing fitted to the wall of said chamber and having an exit opening, a float actuated valve regulating the communicating opening between the pipe and chamber, a pressure disc, and a spring tension means for holding said disc against the wall of the chamber.

5. A silent inlet valve for closet tanks comprising an inlet pipe for attachment to a pipe, a chamber communicating with said pipe, a casing fitted to the wall of said chamber and having an exit opening, a float actuated valve regulating the communicating opening a between the pipe and chamber, a pressure disc having a hollow stem movable over the stem of said valve, and an adjustable tension means bearing against said disc.



Valve for Closet Tanks.

6. A silent inlet valve for closet tanks

(Continued on page 34)

The Toronto Society of Domestic Sanitary and Heating Engineers.

(INCORPORATED 1911)
(With a view to promoting the businesses of heating and sanitation to organize those persons who are qualified therein in order to allow these trades to insure a standard of efficiency for the protection of the public and for the persons engaged in such businesses).

22 COLLEGE STREET,
TORONTO, ONT.

September 14th, 1917.

Edwin Newsome Esq.
Editor, Sanitary Engineer.
147 University Ave.
Toronto, Ont.

Dear Sir,-

Your letter of recent date with enclosures pertaining to Wrought Iron Pipe VS Cast Iron Pipe, was received and duly placed before the Executive Committee for their consideration.

They instructed me to convey to you their approval of your stand in the above matter, and to assure you of their support in your fight for better then ever materials for all Sanitary Plumbing construction.

I was also instructed to request your attendance at our next regular meeting to be held on Wednesday, September 19th, 1917, at 8.00 P.M., in the Canadian Forester's Hall, 22 College St., on which occasion we would be pleased to have you address the members on Wrought Iron Pipe VS Cast Iron Pipe.

Thanking you for an earlyreply in reference to the above,

I remain,

Yours respectfully,

G. A. Frankland

Secretary.

The above letter speaks for itself. It goes to show that the practical Sanitary Engineers of Toronto are not in favor of using wrought iron pipe for soil and waste pipes when time and experience have proved its unfitness for such a purpose.

A New Method of Estimating Radiation

Practical Working Rules, With Tables, For Using Common Heat Unit Method — Tables Showing Correct Heating For Various Kinds and Sizes of Buildings.

By Carleton F. Tweed, Chicago.

MANY empirical formulas and various rule of thumb methods have been devised for estimating the proper amount of radiation, in square feet, necessary for heating a room. These have not proved to be very rational for they are not flexible. A change in altitude, in boiler pressure, or better in the temperature of the heating medium, or also, as is the case with certain of these rules, a variation in the proportions of the exposed surfaces, will often render a given rule absolutely worthless. A rule that does not meet all conditions is incomplete.

Steam Heating

Value of KRs from Formula.

$$KRs = \frac{K(T_1 - T_2)}{K_1(T_3 - T_1)} \times 1$$

Basis $T_1 = 70°$ $T_3 = 220°$ $K_1 = 1.63$ BTU

	"K"	Value of KRs				
(T_1-T_2) Temperature rise		60°	70°	80°	90°	100
Walls.						
4" Brick, no plaster.	.53	135	157	180	202	229
8"	.39	096	112	127	143	159
12"	.31	076	089	101	114	127
16"	.23	062	072	082	092	102
20"	.21	052	060	069	077	086
24"	.18	044	052	059	066	074
28"	.16	039	046	052	059	066
32"	.15	037	043	049	055	062
4" Brick furring + plaster.	.28	069	080	092	103	114
8"	.24	059	069	079	088	098
12"	.20	044	057	066	074	082
16"	.18	044	052	059	066	074
20"	.16	039	046	052	059	066
24"	.14	034	040	046	052	057
28"	.13	032	037	043	048	053
32"	.12	030	035	039	044	049
12" Sandstone furring + plaster.	.28	069	080	092	103	114
16"	.23	052	072	083	092	102
24"	.23	057	060	074	085	094
30"	.21	052	060	069	077	086
36"	.19	047	053	062	070	078
48"	.17	042	049	056	063	070
2x4 Clapboards, lath + plaster.	.25	062	072	082	093	103
2x4 " Lath, Plaster & fillings.	.10	025	029	033	037	041
Partitions.						
Studs, plaster one side	.49	120	140	160	180	200
" " both "	.34	083	097	111	125	139
Expanded metal-asbestos fill.	.21	052	060	069	077	086
Fireproof tile plaster both side	.30	074	086	098	110	123
Solid plaster - 2"	.60	147	172	196	220	245
" " 3"	.50	123	143	164	184	204
Doors.						
1" Solid wood	.48	118	137	157	176	196
1½" " "	.43	105	123	140	158	176
2" " "	.31	076	089	101	114	127
Roofs.						
Slate on 1" boards.	.43	105	123	140	158	176
Composition.	.30	074	086	098	110	123
Reinforced concrete.	.43	105	123	140	158	176
Sheet iron.	.12	294	343	39	440	490
Corrugated iron.	.15	367	428	490	550	612
Tiling 1" thick.	.80	196	229	261	294	326
4" Concrete-Cinder fill.	.60	147	172	196	220	245
6" " " "	.50	123	143	163	184	204
Windows.						
Single window.	.105	257	300	343	386	428
" " wire glass.	.135	331	386	441	496	551
Double "	.50	123	143	163	184	204
Single skylight.	.110	270	314	360	404	450
Double. "	.60	147	172	196	226	245
Air.						
¼ Cu. ft. of air.		.0029	.0022	.0034	.0039	.0043
½ " " " "		.0037	.0044	.0051	.0059	.0067
1 " " " "		.0049	.0035	.0065	.0079	.0090
1¼ " " " "		.0061	.0073	.0084	.0099	.0112
1½ " " " "		.0074	.0088	.0103	.0119	.0135
2 " " " "		.0098	.0117	.0139	.0158	.0180
2½ " " " "		.0123	.0147	.0172	.0198	.0224
3 " " " "		.0148	.0176	.0206	.0237	.0270
(T_1-T_2) Temperature rise.		30°	40°	50°	60°	70°
Floors.						
Cement or tile on ground.	.30	.037	.049	.061	.074	.086
" " wood over.	.10	.012	.016	.020	.025	.029
Dirt floor.	.20	.025	.033	.041	.049	.057
Fireproof construction.	.10	.012	.016	.020	.025	.029
Cement on brick arch.	.20	.025	.033	.041	.049	.057
¾" wood-plaster below.	.20	.025	.033	.041	.049	.057
" " no plaster.	.40	.049	.065	.082	.098	.114
¾" double wood-plaster below.	.10	.012	.016	.020	.025	.029
" " " no plaster.	.27	.033	.044	.053	.066	.077
Ceilings.						
Fireproof-floor above.	.15	.018	.025	.031	.037	.043
" " no floor.	.30	.037	.082	.021	.23	.143
Cement or tile-floor above.	.10	.012	.016	.020	.025	.029
" " " no floor.	.40	.049	.065	.082	.098	.114
Steel-floor above.	.35	.043	.057	.071	.086	.100
Lath + plaster-floor above.	.25	.031	.041	.052	.062	.072
" " " no floor.	.60	.087	.082	.102	.123	.133

Fig. 1 for Steam Heating.

Writers in a few recent articles have commented upon how variable these formulas and rules are and have made comparisons between them. For example, in one article, a comparison of 13 formulas used by central station companies, the author showed by calculations, for a floor of 5 rooms, a variation of the sum from a minimum of 425 sq. ft. to a maximum of 635 sq. ft. Approximately if one should happen to be right, the use of the other would result in a 50 per cent. error. Since similar comparisons by other writers have shown the same wide variation between results, a general conclusion may be stated that: no empirical formula or rule can be relied upon unless checked with that discretion which comes from years of practical experience and application.

There is, however, one common method now in general use which is rational, is universally advocated by all heating authorities, has been checked by practical experience and application, and is complete, for it can be adapted to any and all conditions of heating. This is commonly known as the "Heat Unit Method."

The principal reason why this method is not more widely used and why there exist so many empirical formulas and rules, which are usually but attempts to simplify this method, is because the calculations necessary have been much too elaborate for the practical man.

The writer found this out in practice and then from a few suggestions given by a fellow engineer, worked out the modified system described herein. However, before attempting to explain how this has been done it will be necessary, in order that all may understand, to describe somewhat in detail the original heat unit method as it is most commonly used.

The Heat Unit Method

Heat is lost from a room in 2 ways, by conduction and radiation through the walls, windows, and other exposed surfaces; and by convection, or heat carried away by the leakage of air outward through the openings of the room, such as cracks, doors, etc., or filtration through the walls.

Fortunately, fairly accurate data are available for determining the first source of loss. This is in direct proportion to the difference between the indoor and outdoor temperatures. The general data are in the form of factors or coefficients, which are usually quoted as the B.t.u. transmitted per square foot of exposed surface per hour per degree difference in temperature. A convention "K" for this factor is in common use and is given for various materials and forms of construction in the first columns of both Tables I and II, given in the Practical Reference Tables of this issue. These values have been compiled from reference to several of the best authorities and represent a fair average of all of them.

A point that must be understood in estimating radiation by any method whatsoever is that certain factors which enter into the problem cannot be accurately determined. Close approximations, however, are possible. The exactness of these depends mostly upon the good judgment and experience of the designer. Perfecting these personal equations is then part of every designer's responsibilities.

(Continued in Next Issue)

Hot Water Heating

Value of KRw from Formula

$$KRw = \frac{K(T_1 - T_2)}{K_1(T_3 - T_1)} \times 1$$

Basis $T_1 = 70°$ $T_3 = 170°$ $K_1 = 1.45$ BTU

	"K"	Value of KRw				
(T_1-T_2) Temperature rise		60°	70°	80°	90°	100
Walls.						
4" Brick, no plaster.	.53	228	266	304	342	380
8"	.39	162	188	215	242	269
12"	.31	129	150	171	193	214
16"	.23	104	121	138	155	173
20"	.21	087	102	116	131	145
24"	.18	073	087	100	112	124
28"	.16	067	078	088	100	110
32"	.15	062	073	083	093	104
4" Brick, furring + plaster	.28	116	135	155	174	193
8"	.24	099	116	133	149	166
12"	.20	083	097	111	125	138
16"	.18	075	087	100	112	124
20"	.16	067	078	088	100	110
24"	.14	058	068	078	087	097
28"	.13	054	063	072	081	090
32"	.12	050	058	067	075	083
12" Sandstone furring + plaster	.28	116	135	155	174	193
16"	.23	104	121	138	155	173
24"	.23	093	111	127	143	159
30"	.21	087	102	116	131	145
36"	.19	079	092	105	118	131
48"	.17	071	083	094	106	118
2x4 Clapboards, lath + plaster.	.25	104	121	138	155	173
2x4 " Lath, plaster + fillings	.10	042	049	055	062	069
Partitions.						
Studs, plaster one side	.49	203	237	271	304	338
" " both "	.34	141	164	188	212	235
Expanded metal-asbestos fill	.21	087	102	116	131	145
Fireproof tile plaster both sides	.30	125	145	166	187	208
Solid plaster 2"	.60	248	290	331	372	414
" " 3"	.50	208	242	277	311	346
Doors						
1" Solid wood	.48	199	232	266	298	331
1½ " "	.43	178	207	237	268	296
2 " "	.31	129	150	171	193	214
Roofs.						
Slate on 1" boards.	.43	178	207	237	266	296
Composition.	.30	124	145	166	186	207
Reinforced concrete.	.43	178	207	237	268	296
Sheet iron.	.12	497	580	663	746	829
Corrugated iron.	.15	621	714	828	932	1035
Tiling 1" thick.	.80	331	386	441	496	551
4" Concrete cinder fill.	.60	248	290	331	372	414
6" Concrete " "	.50	207	242	276	311	346
Windows.						
Single windows	.105	435	507	580	652	724
" " wire glass	.135	559	652	744	838	931
Double "	.50	207	242	276	311	346
Single skylight.	.110	455	532	607	683	760
Double "	.60	248	290	331	372	414
Air.						
¼ Cu. ft. of air		.0042	.0050	.0058	.0067	.0076
½ " " " "		.0084	.0093	.0067	.0092	.0114
1 " " " "		.0083	.0090	.0116	.0133	.0152
1¼ " " " "		.0104	.0131	.0145	.0167	.0190
1½ " " " "		.0125	.0149	.0174	.0200	.0228
2 " " " "		.0166	.0199	.0232	.0266	.0304
2½ " " " "		.0208	.0249	.0290	.0334	.0379
3 " " " "		.0250	.0298	.0348	.0401	.0455
(T_1-T_2) Temperature rise		30°	40°	50°	60°	70°
Floors.						
Cement or tile on ground	.30	.062	.083	.104	.124	.145
" " wood over	.10	.021	.028	.034	.041	.048
Dirt floor.	.20	.041	.055	.069	.083	.097
Fireproof construction.	.10	.021	.028	.034	.041	.048
Cement on brick arch.	.20	.041	.055	.069	.083	.097
¾" wood-plaster below.	.20	.041	.055	.069	.083	.097
¾" " no plaster.	.40	.083	.110	.138	.166	.193
¾" double wood plaster below	.10	.021	.028	.034	.041	.048
¾" " no plaster.	.27	.056	.075	.093	.112	.131
Ceilings.						
Fireproof-floor above.	.15	.031	.041	.052	.062	.072
" " no floor	.30	.104	.138	.172	.206	.240
Cement or tile floor above.	.10	.021	.028	.034	.041	.048
" " " no floor.	.40	.083	.110	.138	.166	.193
Steel-floor above.	.35	.072	.097	.121	.145	.169
Lath + plaster-floor above.	.25	.052	.069	.086	.104	.121
" " " no floor	.50	.104	.138	.172	.206	.242

Fig 2 Hot Water Heating.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

THE trade as a whole will be interested to know that prices of materials are to a certain extent on the decline ever since last week, chiefly in non-ferrous metals, lead, zinc and the products therefrom.

There is a shortage of the heavier and larger sizes of wrought iron pipe, though the demand is not particularly great.

A number of large buildings are going up in many parts of the Dominion. Rents are a little steadier than some time ago, and this will have a certain amount of influence upon the residence class of buildings.

Pneumatic water systems of all kinds are finding a ready sale, which, too, has a bearing upon the plumbing trade in rural districts. Labor should be a little easier in the near future on account of the slowing down of munition orders.

The new loan to be raised may, if successful, recall many men to the making of a fresh supply of munitions.

Toronto, Sept. 28.—There is still very little improvement in residence building, repairs to heating systems and a few reconstruction jobs has resulted in a little rush work as the colder weather comes round this will change the condition of business.

The slight lull in munition making has prompted several large brass manufacturers to change over their plants to regular lines. If cancellations of munitions are gradual, no doubt the men thus employed will be gradually absorbed.

This should result in a downward trend in prices of metal goods.

Range Boilers Hold Without Change

RANGE BOILERS. — No improvement is noted in the raw material situation for the manufacture of range boilers. Heavy demand for shipbuilding plates has caused supplies to be diverted from the class of materials used in the manufacture of boilers. Prices remained steady and unchanged.

30-gallon range boilers, standard	$13 00
35-gallon standard	14 50
40-gallon standard	15 50
52-gallon standard	28 00
30-gallon, extra heavy	17 00

Wrought Pipe Market Is Still Restricted

WROUGHT PIPE. — Manufacturers of wrought pipe report there is little or no improvement with respect to getting supplies of raw materials. There is a shortage in many of the heavy sizes of pipe. Rolling mill operations are hampered through the working of the licensing system in operation in the United States on iron and steel. Delays are occasioned on account of the routine through which these licenses must pass before the goods are finally released. Demand for pipe is somewhat light owing to the high prices that have been necessary. Prices remained unchanged at the quotations of July 5 list.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917.

	Black	Galvanized
Standard Buttweld.	Per 100 feet	
⅛ in.	$ 5 00	$ 6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld.		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES.

4" and under, 45%.
4" and under, running thread, 25%.
4½" and larger, 40%.

STANDARD COUPLINGS.

4" and under, 35%.
4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces.

Cast Iron Enamelware Holds At Readjustments

ENAMELWARE.—Prices of cast iron enamelware remained unchanged during the time since last issue when readjustments and lower prices were recorded on lavatories. Drinking fountains and bubblers were also lines to be affected, as recorded in our last issue, changes being in a downward direction. Such price movements are welcome to the plumbing trade as they give hope that the day will come when lower prices will prevail more generally and a better demand will again be brought about.

Bath-tubs, roll rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bath-tubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple	16 80
Closets, oak tank and seat	22 00
Do., enamel iron or white vitro tank	23 75

Steady Market For Soil Pipe And Fittings

SOIL PIPE FITTINGS.—Prices remained stationary on soil pipe and fittings, cast iron pipe fittings and malleable fittings. Advances were recorded in some of these lines in our last issue. A fair demand is reported on these commodities. Following are the discounts:

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	10%	15%
Cast elbows, tees, etc.	10%	15%
Plugs	....	30%
Bushings	20%	33%
Flange unions, standard	....	20%
Dart unions, ¼-inch to 2-inch	20%	25%
Do., 4½ in. and larger	....	15%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4-in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.	0 50	0 63
Do., Class B, lb. net	0 22	0 33
Do., Class C, lb. net	0 15	0 22

Excellent Demand On Valves Still Continues

VALVES. — Manufacturers report that they are still running to capacity in their plants on the making of valves, the demand continuing especially good on steam work. Industrial development that has been taking place in Canada within recent months accounts for the continued good reports on this branch of industry. Prices remained unchanged.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45

Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard.	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard.	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Galvanized Sheets May Go Up Again

SHEETS, PLATES.—The decline of 75c per 100 pounds in certain quarters on galvanized sheets seems in fair way to be short-lived, judging from intimations made by dealers during the week. The Customs Department has recently made a decree that the payment of duty on 25 per cent. excess value at the date of purchase applies from the time when the specifications for order were sent to mills. In other words, contracts that were made last October with mills, and on which specifications for shipment were not made until March or April of this year, will be considered as dutiable according to the price obtaining at the date of specification. This is sufficient to cause the dealers to lose the advantage which they formerly apparently had under the rule of duty payable at the time of purchase, which is understood to be the time of contract. Dealers have been to Ottawa to interview the authorities with respect to the new ruling, and if the powers there are implacable, it is possible those concerns who reduced their price will return to the base of $12 for 10¾ oz. Some stocks of both galvanized and black sheets continue to accumulate.

	Per 100 lbs.	
BLACK SHEETS—		
10 gauge	$	$11 50
12 gauge	10 05	11 60
14 gauge	9 95	11 65
16 gauge	10 00	11 75
18-20 gauge	9 80	10 80
22-24 gauge	9 85	10 85
26 gauge	9 90	10 90
28 gauge	10 00	11 00
29 gauge	10 10	.....
3-inch inch plate	.....	12 25
¼-inch boiler plate	....	12 00
GALVANIZED SHEETS—		
10¾ oz.	11 25	12 00
U.S. 28	10 95	11 70
U.S. 26	10 65	11 40
22 and 24	10 50	11 25
18 and 20	10 35	11 10
16	10 20	10 95
14	10 10	10 85

Suspense Has Caused Unsettled Conditions

CORRUGATED SHEETS, EAVETROUGH.—There is an unsettled condition in the market for corrugated sheets, as buyers have been holding off awaiting developments in the United States. Dealers anticipate that stocks in retailers' hands are low, and that when something definite turns up there may be a rush of buying. There has been some buying of a hand-to-mouth nature, but only immediate needs are looked after. Prices remained unchanged for corrugated sheets, eavetrough and conductor pipe, the two latter commodities being quoted at 10 per cent. off list.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7.20
No. 26 gauge	9.60-10.00	....

Boiler Tube Stocks Are Getting Lower

BOILER TUBES.—With the recent demand for boiler tubes there has been a noticeable diminution of stocks owing to the failure of dealers to get additional supplies from the manufacturers in the United States. However, it is anticipated there will be sufficient stocks on spot to see the needs of the trade There have been fairly heavy demands through the present calendar year. for boiler tubes within recent weeks both for repair work and on new installations. Prices held unchanged during the week.

1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
4-inch	82 00	67 00
3½-inch	70 00	55 00

Lead Pipe And Waste Pipe Decline 1c Pound

LEAD AND ZINC PRODUCTS.—Following the easier tendency in the pig lead market a reduction in the price of lead pipe and lead waste pipe has been made effective during the week to the extent of 1c per pound. Lead pipe is now quoted at 17c per pound, and lead waste pipe at 18c per pound. Lead traps and bends remain unchanged at 20 per cent. advance on list. Lead wool and lead sheets, together with solder, remain unchanged. Demand for lead and zinc products is only fair.

Lead pipe, lb.	$ 0 17	....
Lead waste pipe, lb.	0 18	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 15¼	0 16¼
Lead, caulking, lb.	....	0 13¾
Lead sheets, 3 lbs. sq. ft.	0 16¾	....
Lead sheets, 3½ lbs. sq. ft.	0 16¼	....
Lead sheets, 4 to 6 lbs. sq. ft.	0 16	0 16¼
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 40	....
Solder, strictly, lb.	0 37½	0 38¾
Solder, commercial, lb.	0 36	0 38½
Solder, wiping, lb.	0 34	0 34¾
Solder, wire, lb.	....	0 41
Zinch sheets, per lb.	0 26	....

Advance Made In Oakum Prices

OAKUM.—Last week an advance in price of oakum was predicted as likely to take effect at the beginning of the week. The expected increase has gone into effect and Clipper oakum, which formerly sold at $18.50, is now being quoted at $21.50. The supply of oakum is said to be getting further out of sight all the time, as deliveries cannot be made to the dealers. The great demands being made for oakum by the shipbuilding industry, combined with a general shortage of raw materials, is the basis for the new advance.

Decline Expected In Old Materials

OLD MATERIALS.—The fixing of prices on copper by the United States Government did not reflect any change in prices on old materials this week, but next week is expected to see a general decline in prices of all metals. For many weeks, despite the fact that collectors of old materials have been holding their goods for higher prices, wholesalers have not been thinking along the line of higher prices. Following are present quotations:

TORONTO—		
Tea lead	$ 0.07¼	.....
Heavy lead pipe	0.09¼	.....
Yellow brass	0.14¾	0.15
Red brass	0.20	.....
Light brass	0.09½	0.10
Heavy zinc	0.05½	0.06
Heavy copper	0.22½	....
Stove plate, per ton	17.00	18.00
Old rubber boots and shoes	0.08½	.....
Old cast iron, per ton	....	25.00
Overshoes, trimmed Arctics	....	0.06¼
Auto tires	....	0.05¾
Bicycle tires	0.03½	.....
	Per gross ton.	
No. 1 railroad wrought	....	21 00
No. 2 railroad wrought	9 50	10 00
Pipes and flues	....	12 00
No. 1 busheling	....	18 00
No. 2 busheling	....	11 00
Country mixed scrap	....	12 00
Country No. 1 wrought iron	....	18 00

Lead Prices Again Register Decline

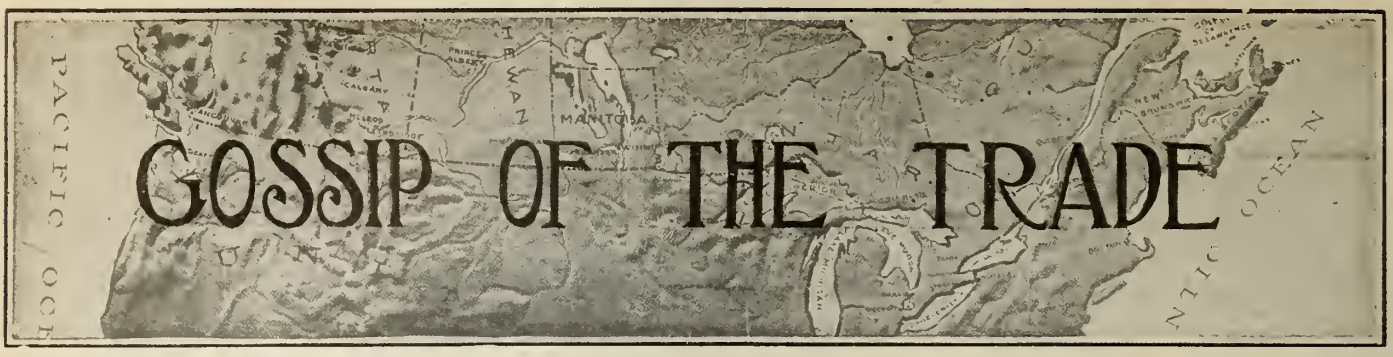
INGOT METALS.—The primary market in regard to tin is very upset at the present, and prices are unobtainable owing to sharp advances which have taken place in foreign markets. With the exception of a slight decline in lead, prices on ingot metals remain steady and unchanged this week.

COPPER.—The situation has been cleared up to some extent by the U. S. Government fixing a price of 23½c on copper f.o.b. New York. It is stated by local dealers that most copper producers have sold their supplies for months ahead, and copper cannot be secured at all. It is, therefore, evident that no supplies will be available even at the fixed figure, if such does apply to the buying of the public and the Allies.

TIN.—The primary market in tin is very upset at the present, and prices are practically unobtainable owing to sharp advances which have taken place in the foreign markets. Prices locally are unchanged. There is a fair inquiry on the market, but it is unlikely that much business will be accomplished.

LEAD.—Lead in the primary market is steady, with buyers confining their purchases to prompt shipments. A decline of 1c per lb. on lead has been recorded locally, following the recent U. S. decline. Local prices have declined steadily during the past few weeks, the range now being from 11½c to 12c per lb.

(Continued on page 31.)



A FALSE RUMOUR

It has been rumoured that The Kerr Engine Co. of Walkerville, has gone out of business. This is by no means the case.

There have however, been some changes in the operation of the business, which does not in any way affect the ownership. The facts are that the company have leased their iron foundries to The Standard Foundry & Supply Company, who will hereafter make all the grey iron castings for the Kerr firm in connection with their extensive valve and hydrant business, and will also go strongly into jobbing work.

PARLIAMENT BUILDING PLUMBING CONTRACT AWARDED

The contract for the plumbing to be installed in the new Parliament Buildings has been awarded to W. J. McGuire Co., Ltd., Toronto and Montreal, the tender being in the neighborhood of $130,000. It will be of interest to every sanitary engineer in Canada to know that if cast iron pipe for soil, waste and drain pipes had been specified, this work could have been installed for nearly $20,000 less. No blame should be attached to the sucessful contractor for the use of wrought iron pipe. But it is evident that the time has arrived for some stand to be taken by the trade in matters of this nature.

It is high time that experts of questionable abilities should be "checked up" and only those who have had years of practical experience, not mere "professors" entrusted to spend our hard earned money as is the case with the installation referred to above where foreign material is deliberately and needlessly specified at the expense of the Canadian people.

A NOVEL WINDOW SIGN

The Hotsteam Heater Company of Cleveland. Ohio, have a nicely gotten up window sign for distribution amongst the trade.

It is in the form of a transparent label in blue, white, orange and red. The words "Sanitary Engineer" stands out very prominently with a centre bearing the trade-mark title "Hotsteam."

It appears to be something new in Canada and those plumbers who are striving to cast off their old title and to replace it by that of "Sanitary Engineer," will do well to procure a supply of these novel transparent window signs.

A post card to the main office and factory at Cleveland, Ohio, or to the Canadian representative W. H. Cunningham, 98 Kingswood road, Toronto, will procure a supply for the readers of SANITARY ENGINEER.

ONLY PASSED ON

Heroes are found not only on the field of battle but in civil life also. Worthy of the title are men that have lived their lives in the interests of others. Men who have made our towns and cities better places to live in, who have fought the fight for sanitation, often at the risk of being looked upon with no small amount of scorn by those who were of a more selfish or more careless nature.

The City of Ottawa is a better place to live in because "Jimmy Jacques" once lived there. He was a plumber, a real plumber. A man who worked hard all his life and took a great deal of interest in having work done properly, all in the interest of the public.

Jimmy had a hard job, he worked hard and well as chief plumbing inspector in Ottawa, and for many years worked alone and unaided.

The Ottawa City Council will never know of the good work he did, and did it thoroughly; yes, and accomplished more than it was fair to ask of any man. A city that has grown as Ottawa has requires at least 3 inspectors, if the public's interests are to be served efficiently by watching the men who make a habit of putting in botched work, and "Jimmy" worked single handed for years.

There never was a more obliging fellow. Kind. and true to the trust placed in him. Knowing his trade as he did, he could easily "ketch on" when a blind vent, or a cracked hub was being "put over" or even when a "fake test" was being worked.

From the "roughing in" to the finishing Jimmy was right on to every trick and didn't he need to be when anybody can get a license in Ottawa who has the "price"?

Well, Jimmy has handed in his "time." He's gone aloft where there's neither smoke nor water tests and we know that every one with whom he was ever in contact will miss him. The SANITARY ENGINEER joins his many friends in conveying their heartfelt sympathy to those he has left at home to mourn their loss. He was a man among men and his spirit still lives and will live on.

A HEATING SYSTEM OF KOREA

A novel heating system called Ondol has been devised by the Japanese living in Korea so that they may withstand the rigorous winter climate of that peninsula. In this arrangement the whole floor serves as a stove. The floor is first made with a layer of mud, which is intersected by three or four flues which radiate from the fireplace and converge into the chimney on the other side of the room. Large slabs of stone are laid over the mud floor, the joints being made air-tight with clay. A layer of clay is then added on top of the stone, and finally the whole is covered with thick oiled paper.

The fireplace is outside of the wall and the smoke and heat pass through the flues in the floor to the opposite side of the house. In this way the whole room is effectively warmed. It is said that no stove is needed in such a room even on exceedingly cold days.—From Bulletin 39 of the Japan Society.

WINNIPEG PLUMBING DEPARTMENT REPORT FOR AUGUST

Plumbing Division

Inspections			Permits issued	
			60	
Water tests	Smoke tests	Subsequent inspections	Miscellaneous inspections	Defects rectified
67	105	233	23	164

Sewer Division

Permits issued	Connections constructed	Inspections
20	21	125

Flushings

Tank flushings, Gallons	Hose flushing Gallons	Total gallons of water
1,194,752	713,125	1,907,877

The above table shows the work executed by the plumbing and sewer department of Winnipeg, Manitoba, for the month of August

MUELLER MFG. CO. TO BUILD HALF MILLION DOLLAR PLANT AT PORT HURON, MICH.

The Mueller Manufacturing Company, of Decatur, Ill., and Sarnia, Ont., is to have a half million dollar plant at Port Huron.

This is the announcement just made by the industrial committee of the Chamber of Commerce. Negotiations have been in progress for several months past, which have finally resulted in a contract being made between the Chamber of Commerce representatives and the company.

Here, in brief, is the agreement between the Chamber of Commerce and the Mueller Manufacturing Company:

The company is to erect and operate a plant which, with equipment, will cost in the neighborhood of $400,000.

The plant is to be in operation within ninety days from the time that Port Huron has raised the money necessary to bind its end of the bargain.

The Port Huron Chamber of Commerce is to pay the Mueller Manufacturing company the sum of $40,000 which will just cover the site of the new plant.

This money is only to be paid after the plant is in operation in Port Huron and has expended in wages here the sum of $40,000.

This means wages of employees of the factory and not the money spent in construction work or anything of that nature.

The $40,000 to be paid to the Mueller Manufacturing company is to be given in four equal installments, beginning next March. The money, however, is to be raised at once and kept in readiness for them.

The Mueller Manufacturing company, of Decatur, Ill., is one of the oldest concerns in its line of business in the world. It was established in 1857 by the father of the five Mueller brothers, who now with their brother-in-law go to make up the company.

The Port Huron plant will, according to Mr. Oscar Mueller, who is at the head of the big Sarnia firm, be the extruding plant. Mr. Mueller explains that the process of extruding brass does away with the old method rolling it into brass rods and is a great advance in the industry. It is expected that brass tubing will also be manufactured here.

"We picked out Port Huron," said Mr. Mueller, "for several reasons. In the first place we want to locate there because the city has many natural advantages. In the second place we get the benefit of lake shipping as well as rail, and in the third place we are closely in touch with our Sarnia plant. We regard Port Huron as ideally located for an industry of our kind and as a place in which men might live and get something out of life."

Mr. Mueller is not a man given to rash promises, in discussing the future of the industry. He is, however, very optimistic and believes this is only the nucleus for a great industry.

"We will be ready for business in short order," said Mr. Mueller. "We will only be waiting on Port Huron. Our material and machinery are ordered and are only awaiting shipping directions. Every day counts now and we don't want to lose any more time than is absolutely necessary."

The new plant, according to a conservative estimate made by Mr. Mueller, will start off with about three hundred employees. This number will be increased as the plant is enlarged and it is planned to build permanently and for the future, as well as for the present. This is indicated by the plans for the first buildings to be constructed.

A rod mill 86 by 140 feet.

A power house.

Sheds and other buildings.

The mill and foundry will be of structural steel and absolutely modern and fireproof. These buildings will accommodate the plant at the beginning only, but will be of sufficient size to make it possible to get under way immediately.

The extruding process of manufacturing brass rod is done with what are known as two thousand ton extruding presses having a capacity of 100,000 feet of brass rod daily. The rod is made from brass billets and forced through a die of the size desired.

A PLUMBER'S BILL

Judgment for the plaintiffs, in full of their claim, was given by Judge Winchester, to Potts and Smith, plumbers, of Regina, who sought to recover the sum of $594.15 from W. Percy Gillespie, a broker of Toronto, for plumbing work done at the residence of J. H. H. Young in this city.

PERSONAL

Sergt.-Major Scott Bartleman, formerly of the 111th Battalion, is reported killed in action. Deceased was born in Scotland 33 years ago. When he came to Canada he located at Galt, Ont., where, after a short time, he was appointed secretary of the Board of Works and later superintendent of the waterworks department.

GOSSIP

M. Slobasky, plumber, Windsor, Ont., has discontinued business.

J. A. Francoeur & Co., plumbers, etc., Montreal, Que., have registered Mrs. J. E. Francoeur.

Turcot Limited has been incorporated at Montreal, Que., with a capital of $49,000 to carry on wholesale and retail business in plumbing, roofing and building materials.

Lavigueur & Menard, Montreal, have plumbing, heating and roofing contract on $25,000 church.

Verdun, Que.—The City Council have awarded tenders for sidewalks and sewers to the M. J. Stock Paving & Construction Co.

CONTRACTS AWARDED

St. Thomas, Ont.—Hamilton & Stett, 430 Talbot St., have plumbing contract for $15,000 bank for Canadian Bank of Commerce.

Montreal, Que.—Thos. O'Connell, 183 Ottawa St., has plumbing and heating contract for $53,000 picture theatre.

Halifax, N.S.—Michael Day has plumbing contract for $25,000 abattoir for City Council.

Lachine, Que.—Collins & Savaria, Montreal, have plumbing contract for $35,000 factory addition for Dominion Wire Rope Company.

New Toronto, Ont.—Fiddes & Hogarth, Ltd., have plumbing contract for $50,000 sub station for Provincial Hydro-Electric Commission.

Renfrew, Ont.—John Conley & Co. have the plumbing and heating contracts for $40,000 hotel addition for the Renfrew Hotel Company.

Quebec, Que.—J. B. Cote, 49 Grant St., has the plumbing and heating contracts for stores costing $50,000, for Eug. Julien Co., Ltd., 1228-1232 St. Valier St.

London, Ont.—Eggett & Co., 336 Ridout St., have the plumbing and heating contracts for $20,000, two-storey home for the London Health Association.

Walkerville, Ont.—The Windsor Hardware Company, 69-71 Sandwich St. E., Windsor, have the roofing, plumbing, heating and sheet metal work for bank for the Canadian Bank of Commerce.

Downie Township, Ont.—Wm. Connelly, Stratford, has the general contract for drainage system costing $3,500, for the Township Council.

Sandwich, Ont.—The Chick Contracting Co., McDougall St., Windsor, have the general contract for sewer pipe for the Town Council.

Windsor, Ont.—The Chick Contracting Company, McDougall St., have the general contract for sewer pipe for the City Council.

MARKETS REPORTS

(Continued from page 29.)

SPELTER.—The local market in spelter is firm, but less active at unchanged quotations. The local price is 10½c per pound. The primary market is also steady, with consuming demand showing no improvement.

ANTIMONY.—The general situation is unchanged, although the market has a weaker tendency. The local price on antimony is 19c per pound. In the primary market some sales have been made of prompt antimony at $15.25 for November delivery.

ALUMINUM.—The market is quiet and demand light, with quotations unchanged at 62c per pound.

PIG IRON.—The pig iron market continues unsettled with the trend of prices downward. There is, however, so little pig iron changing hands at the present time that there is practically no market price. The embargo and shortage of cars are both tending to keep prices up in spite of the belief that the market will decline. Buying is generally hand-to-mouth, and stocks are low both at the foundries and furnaces.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

MORE ABOUT DRIVEN WELLS

Editor, Sanitary Engineer,—

Your answer to the inquiry by F. V. W., Ontario, noted. As I have had considerable practical experience with driven wells I thought I would add a tip or two. Placing a rod inside the driven pipe to find if there is water therein will be useless if the point is filled with quick sand, or in clay, or even in soil of any other kind where there is no water for the simple reason that in either of these cases any water used to prime the pump will find its way inside the pipe and remain there until it finds a vent at the bottom, which it will only do if there is water there. If the point is not blocked with quick sand and there is water at the inlet one certain way to know this is that no matter how much water is poured into the open top of the pipe it will be impossible to fill the pipe with water. If there is no water, or the pipe is filled, or partly filled, with quicksand it will be almost a certainty that the pipe can be filled with water which will remain in it unless the sand is pumped out. This can be done by using a 1¼ inch x ½ inch bushing on the pump coupling and attaching ½ inch pipe to it, the pipe is run to the bottom of the 1¼ inch pipe, water is poured into the top of the 1¼ inch pipe and the sand can then be pumped out. I have driven at least 50 such wells and in every case, where there was water, the level of the water came high enough up the driven pipe to allow an ordinary pump to lift it although some of the wells driven were 45 feet deep. In some cases we attached a cylinder, with a ⅛ inch hole drilled in the pipe just above it, so that an ordinary pump was converted into an anti-freezing outfit. However, one thing is certain, if it is possible to fill the pipe with water the pump will not work. That is the well driver's certain information sign.

James E. Noble,
Portsmouth, Ont.

P.S.—In making the anti-freezing outfit, the plunger and valve are removed from the top pump and a rod is run from the cylinder plunger to the pump handle.—J. E. N.

SAFETY OF AUTOMATIC CONTROLS

Editor, Sanitary Engineer,—

Are the automatic controls on hydropneumatic water systems absolutely reliable? Would it not be highly advisable for all firms to put a relief valve on the tank to safeguard against explosions, or would the gasoline engine or electric motor stop before high enough pressure would be attained for blowing up the tank?—R. R. G. G.

As far as can be learned, the majority of automatic controlling devices on pneumatic water systems can be relied upon. There are very few accidents and very little cause for alarm.

In an electrically driven outfit the majority are equipped with a pair of fuse plugs that would blow out long before a dangerous pressure had been generated, even though the controling device did refuse to respond to the pre-determined setting.

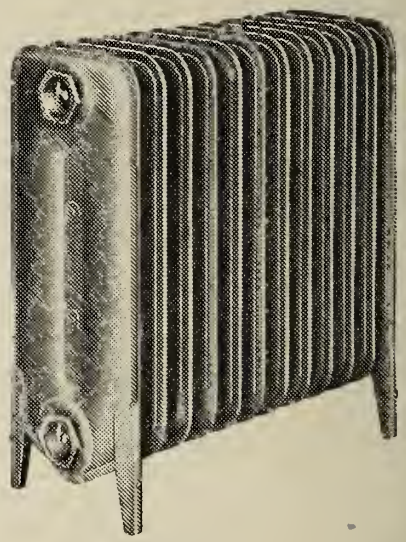
A relief valve has been found to be more of a nuisance for the simple reason that air will escape where steam or water would not. Then again, it so seldom occurs that a relief valve is necessary, that when one is fitted on a pneumatic system, it so seldom operates, which results in it sticking, when it should have been active. All these matters are thoroughly considered in up-to-date systems.

When a pneumatic water system is gasoline-engine driven, it is a simple matter, a small valve, very much like the principle upon which the pop valves are made, can be procured with nearly every system, viz., a valve is operated by pressure, and when the pressure rises to an abnormal height, or rather to a pre-determined height, a small lever is raised suddenly, cutting off the spark magneto. This, of course, stops the engine.

In windmill driven pneumatic systems some other similar outfit is adopted. Frankly the writer believes that the "relief valve" would become more of a nuisance and is not as safe as present well-tried-out methods.—Editor.

NEW WALKER RADIATORS

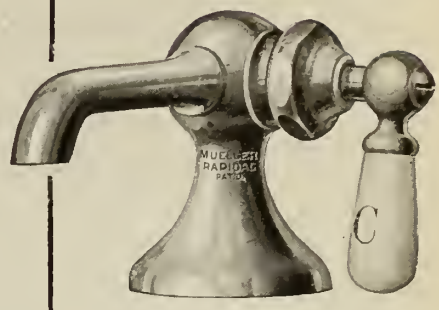
The Kansas City Radiator Co., Kansas City, Mo., are the makers of the Walker radiators, which are said to possess many desirable features, a few of which are named herewith: "Amount of floor space formerly occupied by cast iron is diminshed nearly one-third, weight of radiators reduced to less than one-half, and heating efficiency greatly increased without sacrifice of strength or durability; are



New Walker Radiator.

sectional and interchangeable with no end or leg sections; used equally successfully in steam, hot water, vapor or vacuum heating; especially constructed of special rust-resisting wrought iron; joints at all points reinforced and sealed against weak connections and punching of holes entirely avoided by an ingenious device of great strength." Full information may be secured by addressing a line to the manufacturers.

"There, I'm proud of that job"



If when you finish each installation of plumbing fixtures you want to feel perfectly satisfied; if you want to feel that each job is a standing advertisement of your business ability and workmanship; if you want to be able to say: "I'm proud of that job," attach only

MUELLER
Rapidac
BRASS GOODS

Mueller Goods will improve any class of fixtures. They add that touch of grace and refinement that marks the difference between an ordinary and a high-class job. They raise the standard of your work, and help to put you in the "top-notch" class.

The added value Mueller Goods give in appearance and service more than offsets their slightly higher cost. Their beauty of design and the fact that they are fully warranted will generally convince your customer that Mueller Goods are really the most economical.

Sold by jobbers throughout the Dominion.

H. Mueller Mfg. Co., Limited
Makers of High-Grade Water, Plumbing and Gas Brass Goods
SARNIA :: :: ONTARIO

comprising an inlet pipe for attachment to a pipe, a chamber communicating with said pipe, a closet fitted to the wall of said chamber and having an exit opening, a float actuated valve regulating the communicating opening between the pipe and chamber, the top wall of said chamber being bevelled, a pressure disc resting thereon having a hollow stem, an adjustable shell having threaded connection with the casing, and a spring interposed between said pressure disc and shell.

7. A silent inlet valve for closet tanks comprising an inlet pipe having a chambered portion with a communicating opening between the same, said chambered portion adapted to bear against the tank, a ring about the pipe for engagement with the bottom of the tank, a raised valve seat between the pipe and chamber, a casing fitted about said chamber and provided with an upright portion, a shell having threaded connection with the latter, a float actuated valve adapted to engage said seat, a pressure disc seated upon the wall of the chamber, and a spring interposed between said shell and disc.

PRACTICAL SHEET METAL WORK

(Continued from page 19.)

board, the latter being the most modern and preferable method. Secondly, by installing cold air openings to provide fresh air from the outside. Plate 20 shows a number of ways in which this can be done.

There is no question as to the frequent failure to provide fresh air which is simply due to the fact that those installing the furnace are not sufficiently convinced of its necessity, or, if they are, they do not care a snap about the health of the occupants of the home.

Several authorities are advocating that all heating and ventilating appliances should be installed in accordance with known laws of health and that the health authorities should lay down certain rules to be followed and enforced. No doubt such a movement should be endorsed to the limit by every person interested in installing warm air or any other heating systems.

By the enforcement of such law the cheap Jack botcher would soon become extinct. Scores of tenders for heating systems have been thrown out because of price, while, in fact, the highest price was the best in point of value.

The accompanying table gives the sizes of cold air pipes required according to the warm air registers necessary.

MAIN HOUSE TRAP AND BREATHER PROBLEM

(Continued from page 23.)

P. B Barr, Tulsa: "In the comparatively new city of Tulsa we have no house traps nor do we have trouble with sewer gas. I believe the sewer should be ventilated, and where the house trap is used, it, in my opinion, entails the expense of a vent to the sewer. I think the omission of the house trap on a few buildings puts the ventilation of the sewers on their piping systems, and I believe then that all traps should be removed."

Would Be Cautious

L. J. Devine of Pittsburgh, said: "There are many places where the elimination of the main house trap would cause trouble, and I would not favor a sweeping abolishment of it.

T.J. Lee, Pittsburgh, remarked: "That on a hilly city like Pittsburgh there are advantages of continuing the use of the man house trap."

State of Ohio Prohibits Main House Trap

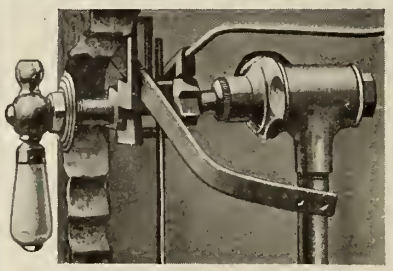
President Groeniger, Chief Plumbing Inspector for the State of Ohio, said: "The law of Ohio prohibits the use of the main house trap. It is an unsanitary contrivance, is costly and prevents the main sewers being properly ventilated.

It is, however, permitted providing the trap is ventilated on both sides, each vent pipe must be extended up above the roof of the building."

Never Used Main House Trap

E. R. McKay of Wilmington, Del.: "We have the sweetest sewers of the country in Wilmington, Del., which sits on a hill, and all waste drains away from the river. There are no house traps, so air is constantly circulating through the sewers and prevents the accumulation of any matter that would be objectionable."

Continued in future issue



TRADE SILENTFILL MARK

Water Closet Combinations Without Ballcocks— No Noise

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40-42 Lombard St., Toronto, Can.

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3 BIG REASONS WHY YOU NEED

PURO

(MADE IN CANADA)

1. Puro Sanitary Drinking Fountains will give you a *better* water supply *cheaper.*
2. Puro will cut your water bills 15% to 35%.
3. PURO will safeguard the health of your employes and raise the standard of efficiency.

Are not these reasons enough? Then why hesitate longer?
PURO equipment is not expensive—the first cost is *low* and the up-keep *nothing.* Easily attached; positively fool-proof. Let us make you a special proposition for a try-out in one of your departments. Write us now—to-day—giving us the number of men; an inquiry will cost you nothing.

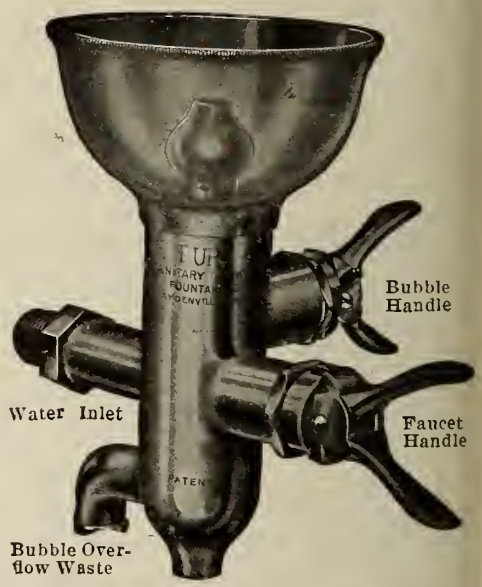
"PURO-FY"

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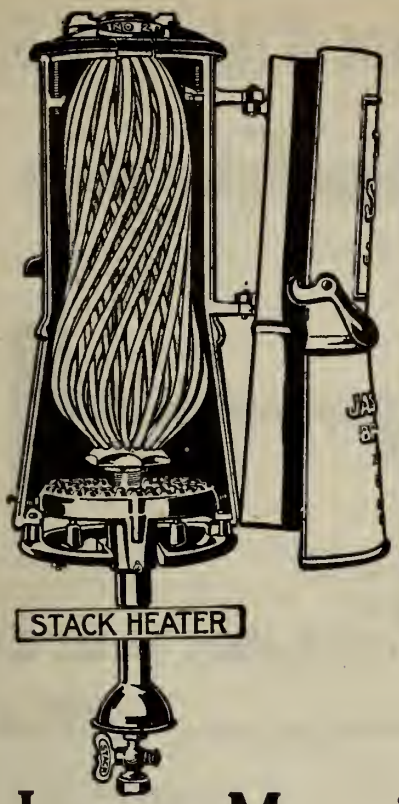
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PRACTICAL, EXPERIENCED PLUMBER AND steamfitter wishes position with wholesale plumbing and heating concern, as salesman preferred. References furnished. Apply Box 702, Sanitary Engineer, Toronto.

FOR SALE

UNDERWOOD TYPEWRITERS — MODERN visible machines equipped with such improvements as back spacer, bi-chrome ribbon, tabulator and automatic ribbon reverse. Five-year guarantee. Sold for cash or payments. Free trial. Send for proposition to-day and save more than half regular price. Address—Arthur O. Secord Co., Limited, Dept. 3, Brantford, Ontario.

Don't forget when you have completed your work to inspect it yourself and thus avoid trouble.



STACK FACTS

From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited

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HOYT METAL GOODS ARE KNOWN

FROM COAST TO COAST



As time-savers there are none equal to our Wiping Solder Bar or Wire Solder.

Hoyt Lead Traps, bends and waste pipe are in a class by themselves.

Our Mixed Metal Sales Amount To Over $5,000,000 Annually.



Write your Jobber

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y., London, Eng., St. Louis, Mo.

Write Us



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

WILLIAMS' "VULCAN" CHAIN PIPE VISES

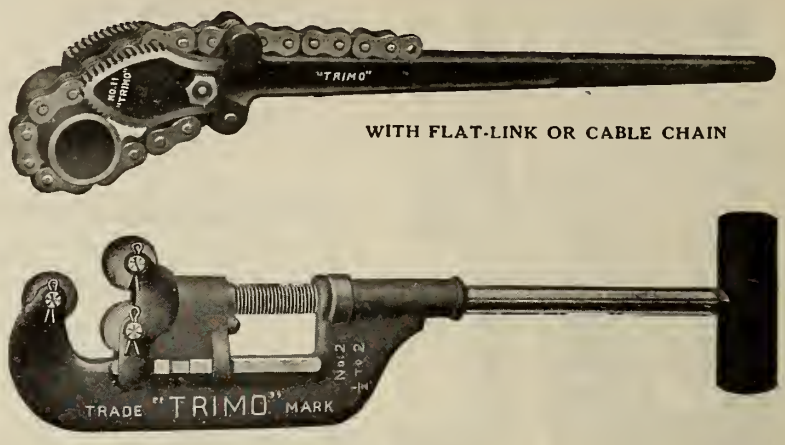


Only the penny wise begrudge the price of "VULCAN" sufficiency. Experienced buyers will take nothing else.

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77 RICHARDS STREET BROOKLYN, N.Y. CITY

World-Famed Specimens of the Age of Steel

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TOOLS

WITH FLAT-LINK OR CABLE CHAIN

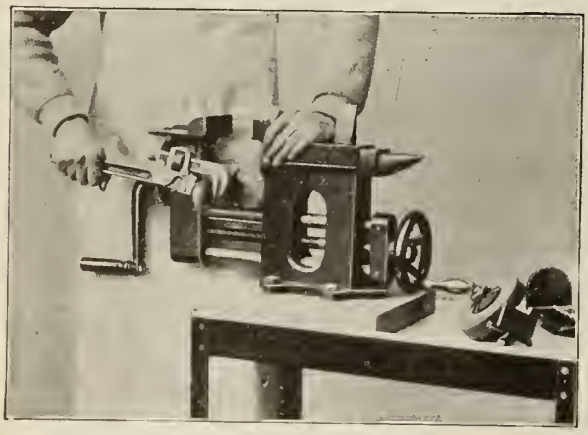
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An Equipment All in One



WEIGHS 90 POUNDS

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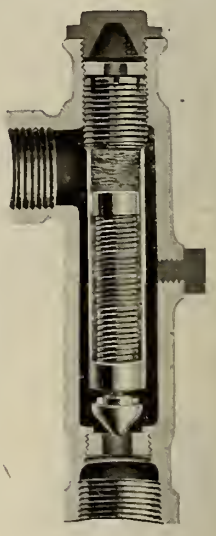
A Pipe Vise
A Bench Vise
A Bench Grinder
A Two-Speed Drill
A Hardy Cutter
An Anvil

It's not a toy. It's a real combination of practical tools for practical people.

Write for full particulars.

CHICAGO FLEXIBLE SHAFT COMPANY
Department H.W. CHICAGO, U. S. A.

Trap Every Steam Line
With a "SARCO"— Radiators Too



The Steam Trap "SARCO" is not like other steam traps, it relies on the expansion of a heavy hydrocarbon oil operating a Sarco spirally corrugated Tube within a renewable cartridge. When steam reaches the cartridge, the trap closes and no steam escapes. When condensation collects the trap opens and discharges it.

The "Sarco" can be used on either steam lines or radiators, for low pressure, vapor or vacuum heating system; is easily installed, automatic in operation.

The "Sarco" is absolutely noiseless, self-cleaning and no moving parts. All parts of the interior are interchangeable and removable. The "Sarco" can be attached to radiators at any angle, and in any position.

Prices low. Write us at once. Can make prompt deliveries.

Peacock Brothers, Montreal
and 220 King Street W., Toronto
BRUCE G. McBURNEY, E.E., *Representative*
Winnipeg, Edmonton, Calgary, Vancouver and Victoria, B.C.

Look at these thin waterways

In the thin waterways of the "King" Boiler the water is heated quickly with a minimum quantity of fuel; the circulation is more rapid and consequently the water in the radiators is **always warm.**

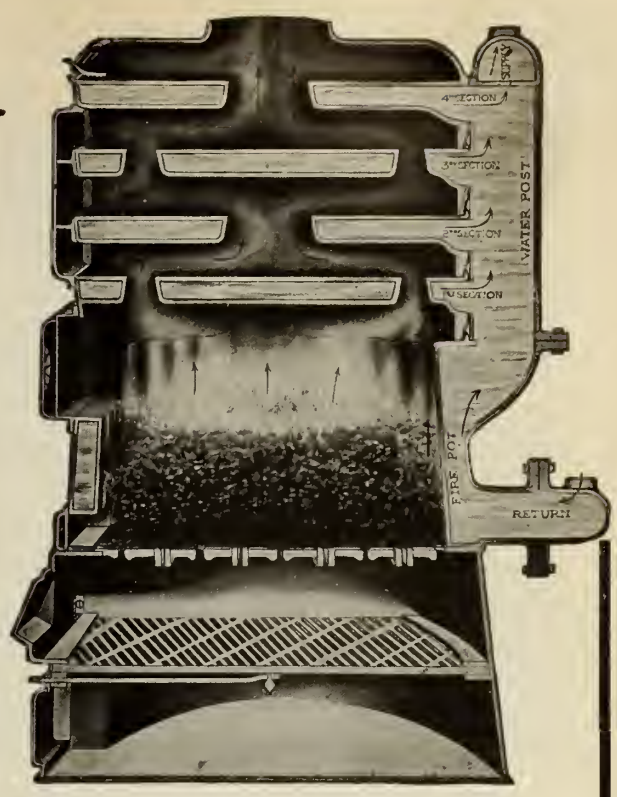
There are numerous other "King" features that make them more efficient and economical such as the wide heatways and the deep fire-pot. These are real heat facts that will impress and convince your customers.

STEEL and RADIATION, Limited

Head Office: FRASER AVENUE, TORONTO

304 University Street, MONTREAL **101 St. John Street, QUEBEC**

AGENCIES IN ALL LEADING CITIES



Sectional View "KING" Boiler

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C. A. Dunham Co., Ltd., Toronto.

Air Valves.
Beaton & Cadwell Mfg. Co., New Britain, Conn..
Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Asbestos Goods.
James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
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Canadian Brass Co., Ltd., Galt, Ont.
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Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Brass Pipe and Tube.
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Canadian Wolverine Co., Ltd., Chatham.
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James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Bubblers.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.

Cellar Drainers.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

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Closets.
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Empire Mfg. Co., Ltd., Ont.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.

Country Residence Equipments.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Limited, Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Damper Regulators.
W. E. Clark Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., 143 University Ave., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Ejectors, Steam.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

Ejectors for Sewage.
National Equipment Co., Ltd., Toronto.

Enamelware.
Amherst Foundry Co., Ltd., Amherst, N.S.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.

Electric Pumping Machinery.
Canadian Machinery Co., Ltd., West Toronto.
Empire Mfg. Co., Ltd., London, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Fittings.
Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Flushometers.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Floor and Ceiling Plates.
Beaton & Cadwell Mfg. Co., New Britain, Conn..
Beaton & Corbin Mfg. Co., Southington, Conn.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Gasoline Engines.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Gas Water Heaters.
Galt Brass Co., Ltd., Galt.
Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Rolf Heater Co., Columbus, Ohio.

Generators.
W. E. Clark & Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Heaters.
Lord & Burnham Co., Toronto.
Steel & Radiation, Ltd., Toronto.

Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Mixing Valves.
Canada Metal Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
Speakman Supply & Pipe Co., Wilmington, Del.

Monkey Wrenches.
Trimont Mfg. Co., Roxhury, Mass.

Oil Burners
National Rotary Oil Burner Co., Boston, Mass.

Oil Storage Systems.
National Equipment Co., Ltd., Toronto.

Packing.
Canadian Wolverine Co., Ltd., Chatham.

Packless Radiator Valves.
W. E. Clark & Co., Toronto.
Kerr Engine Works, Walkerville.

Pipe and Radiator Hangers.
Beaton & Cadwell Mfg. Co., New Britain, Conn..
Beaton & Corbin Mfg. Co., Southington, Conn.

Pipe, Black and Galvanized.
Canadian Tube & Iron Co., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Pipe Cutters.
Trimont Mfg. Co., Roxhury, Mass.

Pipe Joint Compounds.
Canadian Wolverine Co., Ltd., Chatham.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Pipe, Soil, and Fittings.
Anthes Foundry Co., Toronto and Winnipeg.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Toronto Hardware Mfg. Co., Toronto.

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Borden Canadian Co., Toronto.
John Hall & Sons, Ltd., Brantford.
A. B. Jardine & Co., Hespeler.

Pipe Wrenches.
Borden Canadian Co., Toronto.
Trimont Mfg. Co., Roxbury, Mass.

Porcelain Ware.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Pumps.
Canadian Machinery Co., Ltd., West Toronto.
C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Radiator Foot Rests.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,

Radiator Traps (Steam).
W. E. Clark & Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.

Range Boilers
Toronto Hardware Mfg. Co., Toronto.

Reducing Pressure Valves.
Canada Metal Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Rubber Goods
Canadian Consolidated Rubber Co., Ltd., Montreal.

Septic Tank Valves and Syphons.
Anthes Foundry Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.

Solder.
Canada Metal Co., Ltd., Toronto.
Hoyt Metal Co., Toronto.

Steam Specialties.
W. E. Clark & Co., Ltd., Toronto.
Dart Union Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.
Kerr Engine Co., Walkerville, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.

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Geo. W. Cole Co., Ltd., Toronto.
Canadian Morehead Co., Ltd., Woodstock.
C. A. Dunham Co., Ltd., Toronto.

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James Morrison Brass Mfg. Co., Ltd., Toronto.

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Canadian Machinery Co., Ltd., West Toronto.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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W. E. Clark & Co., Ltd., Toronto.

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James Morrison Brass Mfg. Co., Ltd., Toronto.

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Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Trimont Mfg. Co., Roxhury, Mass.
Williams, J. H., & Co., Brooklyn, N.Y.

Unions.
Canada Metal Co., Ltd., Toronto.
Dart Union Co., Ltd., Toronto.

Vapor Heating Systems.
C. A. Dunham Co., Ltd., Toronto.
W. E. Clark & Co., Ltd., Toronto.

Vent Caps
Malcolm Co., Toronto.

Vitro Tanks.
Cluff Mfg. Co., Ltd., Toronto.

Vacuum Systems of Heating.
W. E. Clark & Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.

Water Supply Systems.
Canadian Machinery Co., Ltd., West Toronto.
Empire Mfg. Co., Ltd., London, Ont.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
National Equipment Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto



154 *Wolff Factory Enameled Lavatories as installed in the Joseph Ryerson Plant, Chicago.*

Quality of Materials and the Workmanship

establish the value of plumbing. If faulty in either particular there is financial loss to the building owner, and reputation loss to architect, contractor and plumber. For over 60 years Wolff Plumbing has been representative of highest quality and perfect workmanship. Its installation is an assurance of complete satisfaction. Why take chances with any other kind?

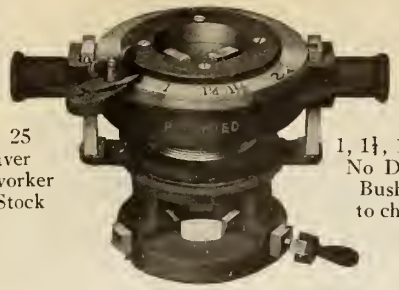
L. Wolff Manufacturing Company

Manufacturers of Plumbing Goods Exclusively

GENERAL OFFICES
601 W. Lake St.

CHICAGO

SHOWROOMS
111 N. Dearborn St.



No. 25 Beaver easy-worker Die Stock

1, 1¼, 1½, & 2 No Dies or Bushings to change

MANUFACTURED BY

You Don't Pay for "Beavers"—

THEY PAY FOR THEMSELVES

Figure it out for yourself! Thousands of Beavers have been in constant use for nearly 10 years—and are still good.

The cost works out at about ½ cent a day for the tool shown in this advertisement.

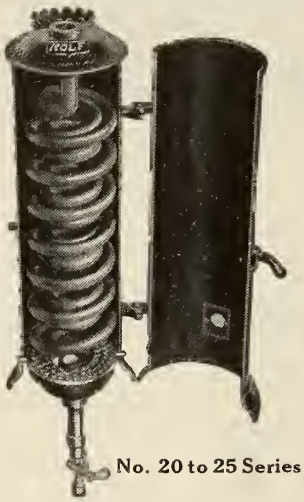
Call up your jobber now—and order a "Beaver" or at least write for booklet D-12.

THE BORDEN-CANADIAN COMPANY

TORONTO, CANADA

ROLF

GAS WATER HEATERS



No. 20 to 25 Series

are made in a modern and complete plant, the entire output of which is devoted to the manufacture of these Heaters.

We are heater experts and we make Rolf Heaters as good as they can be made.

The Rolf Heater Mfg. Co., Columbus, Ohio

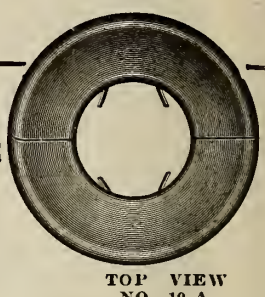
W. H. CUNNINGHAM, 98 Kingswood Road, TORONTO

Canadian Representative



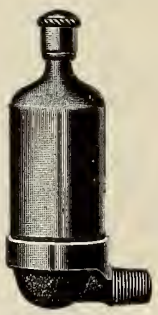
OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

WROUGHT PIPE

BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.

All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES Black and Galvanized All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

Montreal Works: Lachine, Can.

This is the sure coupling

DART



A Dart Union will make the coupling sure and certain and give you a job over which you need have no misgivings. "Bronze to Bronze" seats mean no rust, no deterioration—a right job and a tight job every time. Extra heavy iron parts mean no stretching or pulling apart, and the ball-shaped joint means a perfect connection even when pipes are out of alignment.

For your own sake and your customers use a Dart Union every time.

Saves time—makes sure.
Your jobber sells them.

Made in Canada by
DART UNION COMPANY, LIMITED
TORONTO, CANADA

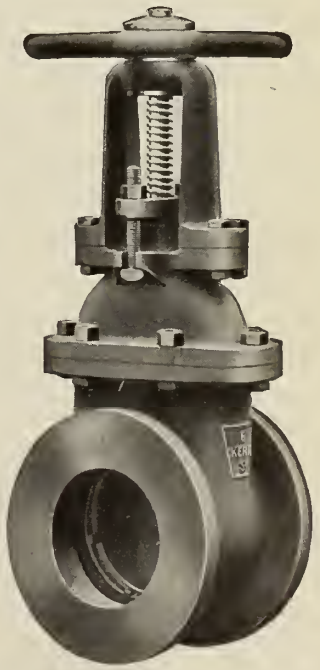
BRONZE TO BRONZE DOES IT.

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

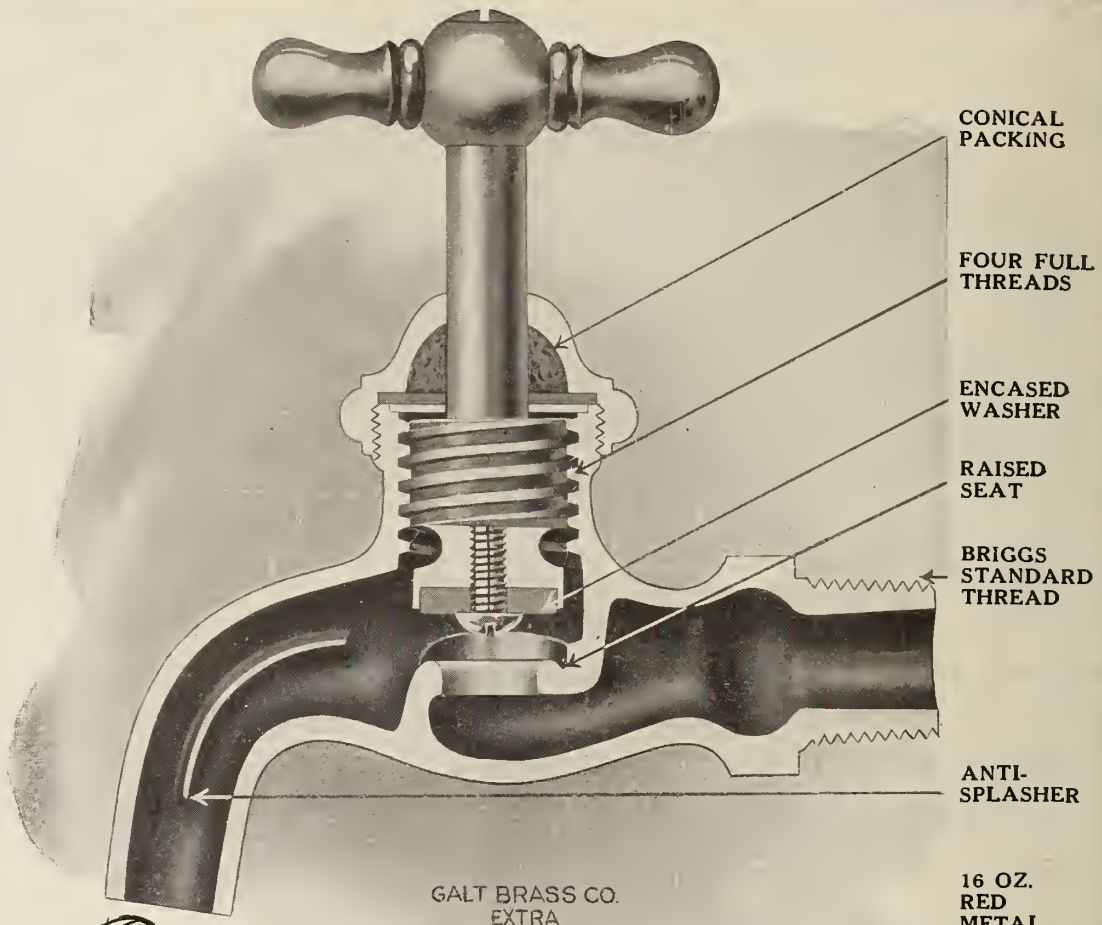
Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

Approved by the Fire Underwriters Association, and Registered by Boiler Inspection Departments of Ontario, Saskatchewan and Alberta.

THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Registered **PERFECTO** *Trade Mark*

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, OCTOBER 15, 1917 | No. 20

EMPIRE

Gate Valves Are High-Grade Quality



Our gate valves can be used on hot and cold water jobs, and can be depended upon to close when closed, and to open full bore when open.

The gates are specially designed, ground true to seats, and are made of metal most suitable for the purpose.

All our brass goods are made to formula, and are therefore of a guaranteed uniformity.

EMPIRE MANUFACTURING COMPANY
Limited

LONDON *TORONTO*

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

ONTARIO:
Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

As To Rubber Quality

"No matter what the rubber article may be, if it carries a Dominion Rubber System brand, I am always sure that the quality is dependable and that it will give satisfactory service."

Hardware and Plumbers' Supplies were the Rubber articles this large user had in mind and his opinion was based upon many years of experience with Dominion Rubber System products.

His testimony goes to emphasize the attention we give to the qualities of our products. We insist on absolutely reliable quality in workmanship as well as material and we stand back of the products that carry our name and brand.

When in need of rubber for your trade, write to our nearest branch where prompt and intelligent attention will be given to your orders.

Canadian Consolidated Rubber Co. Limited

Head Office - - MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Calgary, Lethbridge, Edmonton, Vancouver, and Victoria.

The Largest Manufacturers of Rubber Goods in the British Empire.

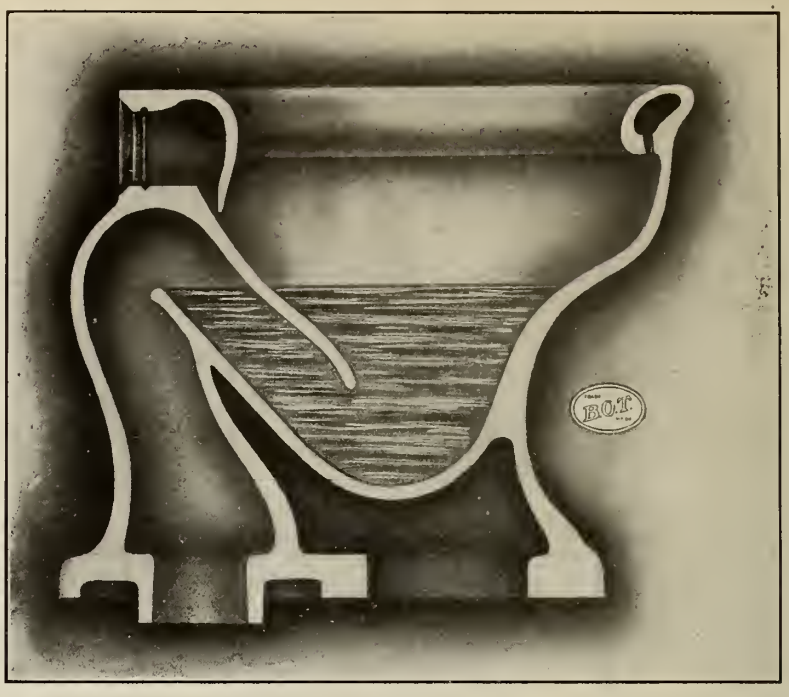
TRADE B.O.T. MARK

High Quality Maintained

Since taking over the B.O.T. products we have recorded excellent results. We are maintaining their high reputation for quality to the utmost degree.

Woodwork is specially treated so that it will not warp or crack. Joints are of special construction. Tanks are lock-doweled, and seats spiral-doweled.

You can't beat B.O.T. Products for wearing qualities and finish.



Complete Line of Brass Goods. There are no better supplies made anywhere than C.B. Products. They are as good as they look.

CANADIAN BRASS COMPANY, LIMITED, Galt, Ontario

Toronto Branch: **159 WEST RICHMOND STREET**

ONE MAN DOES WORK OF TWO

WITH THE

"Jardine" and "Toledo" Pipe-Threading Tools



"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of "**JARDINE**" OR "**TOLEDO**" DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear, too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

WRITE FOR CATALOG OF COMPLETE INFORMATION.

A. B. JARDINE & CO.

HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.





Front view of the fire pot and base sections of the Round Sectional Burnham Boiler. Up above the border is the separate Crown Sheet section.

A BURNHAM BOILER SEPARATION

Its Money-Saving Consequences

THE "Separation" we speak of, is between the Crown Sheet and Fire Pot.
They are *two sections* instead of one.
Here's how the Separation does its money saving:
First and foremost, it saves money for *you* by shortening set-up work.
Crown Sheet and Fire Pot are much easier to get through cellar doors and down cellar steps *by themselves*, than when both are cast together in *one big unwieldly* section.
Boiler can be more easily and quickly set up.
The attendant saving of time and labor is well worth making in these days of high labor costs.
The Separation saves money for your customer by cutting down his repair costs.
If anything happens to the Crown Sheet or Fire Pot, the injured section *only* need be replaced—not the usual *two cast as one*.
He saves the difference between the cost of two sections and the cost of one section.
The Burnham Boiler differs from other boilers in a number of important ways.
Our catalog lines up these ways in a straight-way, brass-tacks manner.
Send for it.

Lord & Burnham Co., Limited
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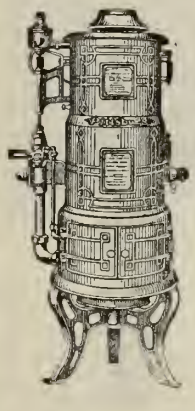


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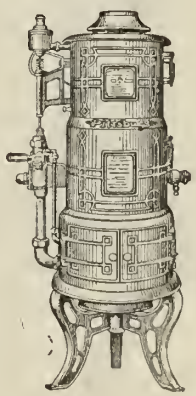
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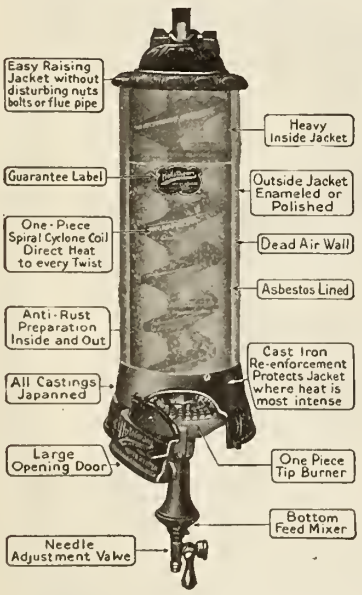
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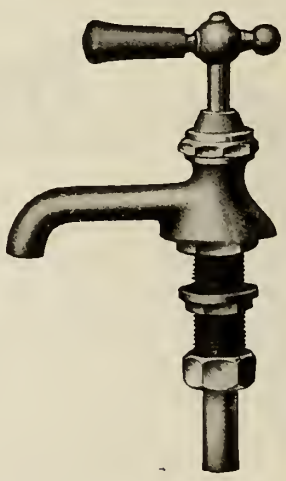
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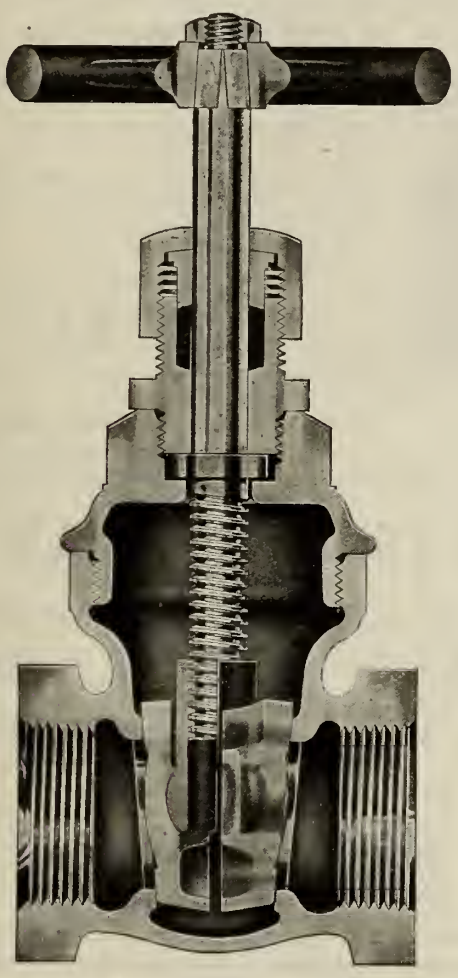


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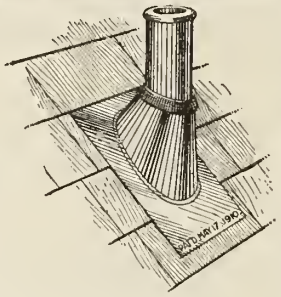
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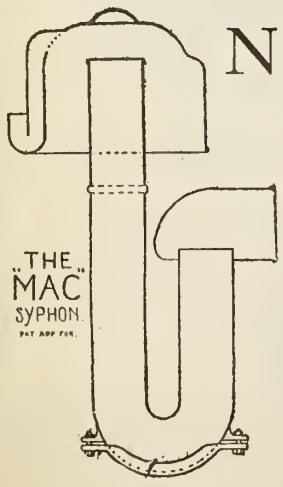
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PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, OCTOBER 15, 1917 No. 20

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EDITORIALS

Skilled Mechanics a Post-War Necessity—Wrought Iron vs. Cast Iron for Soil, Waste and Drainage Pipes—Accident Prevention.

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SANITARY ENGINEER

VOL. XI OCTOBER 15, 1917 No. 20

Plumbing in New Parliament Buildings

Some Interesting Letters Which Have Appeared in the Ottawa Papers—Several Points of Interest Brought Out Which Will be of Value to Every Reader of Sanitary Engineer.

IT is quite evident that manufacturers of wrought iron pipe are doing their level best to load the architects and other would-be ready-to-hand experts with all kinds of piffle regarding the use of wrought iron pipe; and in that case SANITARY ENGINEER will utilize every means at its command to protect the public from the evil results of such misrepresentation. It is an indisputable fact that sanitary engineers in Canada have not had the experience our American cousins have had. It takes time and the experience derived from practical tests to prove that any particular material is fit or unfit for soil, waste and drain pipes.

The laws of nature will not do any more for wrought iron pipe manufacturers in Canada than for those in the United States or other countries, and the very process to date which is required to produce wrought iron condemns its use for the purposes named. It is rather a pity that there are men in business all over the world whose only aim seems to be to make themselves think they are right. We have them on all sides. But scientists, men who are our teachers, men who really prove things, and have had experience that cannot be gainsaid, are the men to whom we all should look.

If it were possible for the architects to be practical men, or to engage men that have had real experience in the shops with the tools, they would not listen to every interested party that comes along to sell his wares. But the architect cannot do this to the extent that he should, so he assumes a responsibility for which he is totally unfitted.

We have evidence of this brought before us every day. One day copper and brass pipe is specified. The architect does not know but bronzed pipe is installed, and he passes the account. Another case where boilers are specified and they are not endorsed by practical men, but the architect is the big push and they go in, with the result that they have to be pulled out in a year or two no good. In another case a certain line of brass goods is specified, but the architect doesn't know what's what. Inferior goods are installed right under his nose, and he passes the account O.K., because he really knows no better.

These are experiences that are cropping up every day. Some years ago a certain big architect specified a pneumatic water system, but did not first find out what the duties of the system were to be. The writer installed it under protest, and it never worked and never could.

Now we have wrought iron pipe being installed in the Parliament Buildings, and a long list of buildings is shown that have had this kind of pipe installed—pipe which will have to be pulled out in a few years. If we were to try to give a list where cast iron pipe is in use and is as good as new, after many years' use, we would have a lifetime job compiling it. Over 100,000 buildings in Toronto, over 25,000 in Ottawa, over 100,000 buildings in Montreal, millions of them in the United States, and, we venture to say, not a leak. But what a difference in the case of wrought iron. We doubt if there are 10,000 fitted with such material—that is, for soil and waste pipes; and those that are have been causing trouble for years. Readers, what is your verdict?

Wrought iron is on a par with clay tile pipe under dwellings. It is in the wrong place, and being put to a use for which it is unfitted. There are thousands of purposes for which wrought iron pipe can properly be used; then why hanker after the business derived by using it for impractical purposes?

It is the duty of every practical man to stand on his dignity and refuse to instal material that has been proved time and again unfit. It is our duty to make men see aright, and not delude even themselves with believing what is not true.

The first letter to appear in the "Ottawa Citzen," August 28, also appeared in the September 15 issue of SANITARY ENGINEER, on page 12. The next letter appeared in the "Ottawa Journal," which reads as follows:

OPPOSE SYSTEM FOR THE NEW BUILDING

Plumbers Here Declare System to be Used Will Not Give Satisfaction

Opposition to the proposed installation of the Durham system of sewage connections in the new Parliament Buildings is being voiced by sanitary engineers in the city, and as a result a letter of protest has been forwarded to Dr. Edwards, M.P., by Mr. R. N. Murphy, of Lisgar street.

In his letter Mr. Murphy calls the attention of Dr. Edwards to the fact that in calling for tenders the architect specifies the Durham system, which provides for tapping the main Ottawa sewer with a long main running direct to the Parliament Buildings, and thence to all fixtures within the buildings, without providing for any intercepting trap on the main drain or its branches.

This Mr. Murphy claims is entirely opposed to Canadian practices, and will not be a success, because of the climatic conditions, which cause freezing at the top of the stack, and thereby leave the whole system without a vent. This would create a nuisance.

Mr. Murphy also calls attention to the new plumbing by-law before the Provincial House this session, which will provide that all private drains must be trapped. If this becomes law, and all drains in Ottawa are trapped except those on the Parliament Buildings, at the highest point, the sewer gases from the whole city will find their way into the Parliament Buildings.

An additional objection is found in the fact that as parts of the buildings will not be occupied several months of the year, the gases will saturate the woodwork of the various rooms, and as a result there will be almost continuous stench through the buildings.

It will be seen that no mention is made of wrought iron pipe, and from information received from the person who really originated the letter, they had no experience regarding that kind of pipe.

The next letter also appeared in the "Ottawa Journal," and still does not give much prominence to the question of kind of piping used, except that the writer would prefer to see cast iron soil pipes used. This, of course, because of the fact that every practical man has proved the durability of cast iron pipe.

Regarding Mr. Murphy's statement that the new plumbing by-law before the provincial house will provide that all private drains must be trapped, we are in position to state that such is not the case. The proposed by-law will not in anyway interfere with any town or city clause that does not allow the use of the main house trap. And if the city of Ottawa does not want the main house trap, and if its elimination has not proved a menace to the health of its citizens then no provincial board of

health will interfere with such installations.

Which System Best?

Sir:—May I encroach on your space in order to correct an article which appeared in your issue this evening, in order to allay any suspicion on the part of the public, in regard to the installation of the plumbing and drainage in the new Parliament Buildings.

Your article states that opposition to the proposed installation of the Durham system is being voiced by the sanitary engineers of the city, and as a result a letter of protest has been sent to Dr. Edwards, M.P., by Mr. R. N. Murphy.

In the first place might I ask if Mr. Murphy has addressed this letter as purporting to come from the Ottawa sanitary engineers as a body, and if so, by what authority does Mr. Murphy assume the office of spokesman or correspondent for them?

Your article seems to be the first intimation of any opposition that I am able to trace.

Certainly no bona fide sanitary engineer would protest against the Durham system, or imagine that the Durham system provides—as a system—for a main "running direct from the sewer and thence to all fixtures without providing an intercepting trap."

May I state, for the benefit of the uninitiated and for Mr. Murphy's information, that the Durham system provides for one thing only in variance with any other systems. This is that galvanized wrought iron is used together with special drainage fittings which allow of screwed joints instead of cast iron pipe and fittings with caulked joints.

The advantage of the Durham system rests upon its greater rigidity.

The respective merits of the two systems is a matter of much controversy, but for several reasons I would prefer to see extra heavy cast iron used. There may be difficulty in obtaining the very high quality wrought iron pipe which is specified.

However, the practice of connecting direct to the sewer is certainly not "entirely opposed to Canadian practice," but—if Mr. Murphy will take the trouble to discover—is, upon the highest authority, the best practice in our newer and more progressive cities.

There are about 27,000 houses so equipped in this city and there is seldom any trouble through the freezing of the stack-terminal.

This only takes place under exceptional conditions and only for a short space of time, and this trouble can be banished by taking simple precautions.

I am afraid that Mr. Murphy is under the impression that a system of drainage is perpetually under pressure when connected direct to the sewer, whereas if he would take the trouble to make tests he might be surprised to find that usually the opposing condition is more often in effect.

It is also news to me that the new plumbing by-law before the Provincial House this session will provide that all private drains—assuming this to mean house connections—MUST be trapped. Does this not read MAY? I sincerely hope so.

Does Mr. Murphy intend the public to believe that when any part of the buildings are unoccupied, it is no one's duty to see that all traps are kept sealed and in sanitary condition?

I think that the public can rest assured that in the hands of Mr. Pearson the sanitary engineering of the buildings will be the best that can be had, as I have it on good authority that his specification is a model of what a plumbing specification should be.

This letter is not written in any vindictive spirit and is not intended to cast any reflection on Mr. Murphy, but to state the other side of the subject and by a trained sanitary engineer with 15 years' experience.

Yours for real sanitation,

A. WALTER ALLEN,

Associate of the Royal Sanitary Institute and Cert. Worshipful Co. of Plumbers, Eng., by Examination.

463 Sunnyside Ave.

It will be noted by the following letter that the writer doubts the accuracy of the statement regarding the condition of the wrought iron pipe now in use in the Chicago City Hall. However, the editor of SANITARY ENGINEER saw this pipe, and visited quite a number of other buildings while in the United States in which wrought iron pipe, very dangerously corroded, is doing service

Plumbing in Parliament Buildings

Editor, Citizen:—In answer to a letter which appeared in the Journal of September 1st, signed by A. Walter Allen, real sanitary engineer, this is a question of interest to all who take an interest in our government buildings, which, when complete, will be an emblem of the character of our people so that every Canadian, for generations, will look to them with pride. It is well then, that the very best sanitary arrangement, combined with the best materials be installed, and it was simply looking toward this end that I wrote Dr. Edwards, drawing attention to this matter. The article in the Journal to which Mr. Allen refers was not written by me, but was written by the Journal newspaper, and the Journal in turn got their information partly from the letter which I wrote Dr. Edwards and partly from a letter written by a sanitary engineer in Toronto, and published in The Citizen of Aug. 28th. I believe this Toronto gentleman is the editor of a magazine, given entirely to the advancement of sanitation, and in his letter in The Citizen he says that he has just returned from the United States where he made an investigation of the system which is proposed for the new Parliament Buildings, and that he would unconditionally condemn the whole sanitary arrangements. He also makes the interesting statement that the sanitary system of the city hall in Chicago, built about ten years ago, and in which was installed the Durham System, is a complete failure.

Mr. Allen asks the question, if I wrote my letter as purporting to come from the Ottawa sanitary engineers. Nothing of the sort; I am not writing the opinion of any association or of any other man or combination of men. I simply pointed out some outstanding facts as they appear to me after a life-time of experience under the climatic conditions of this country.

First, that the buildings being situated on the highest point in the city of Ottawa, if no intercepting traps were installed great volumes of sewer air would find an outlet through the buildings, that traps without vents, such as are proposed to be installed in the new building, are next to useless, and that vents that are open to the damp air of the sewers are useless also in this climate for the reason that they freeze over at the points where they pass to the open air. I pointed out also that the buildings would be occupied for but part of the time and the water in the traps would evaporate leaving the sewerage system open to the different rooms. Let me say that in this connection Mr. Allen suggests that it would be somebody's duty to keep those traps sealed. I do not know by what means Mr. Allen proposes to do this unless somebody be sent with a jug of water every once in a while to put some in the different fixtures, or else that somebody enter each room regularly to open the taps, etc. This, however, is a remote possibility, and I do not think that Mr. Pearson, the architect in charge since this matter has been drawn to his attention, would allow a system of plumbing to be installed in those most important buildings which would require the trusting of some individual to keep such traps sealed by the adding of water at intervals. I feel sure that he will see to it that a system will be installed which will take care of itself at all times. I am also sure that every one concerned, and the public at large, have absolute confidence in Mr. Pearson. No blame can rest upon him or any member of his staff for those are difficulties which have long baffled every man in this cold climate. No effective remedy has ever been found, until very lately, to overcome them, and of those new methods Mr. Pearson has had very little opportunity to judge.

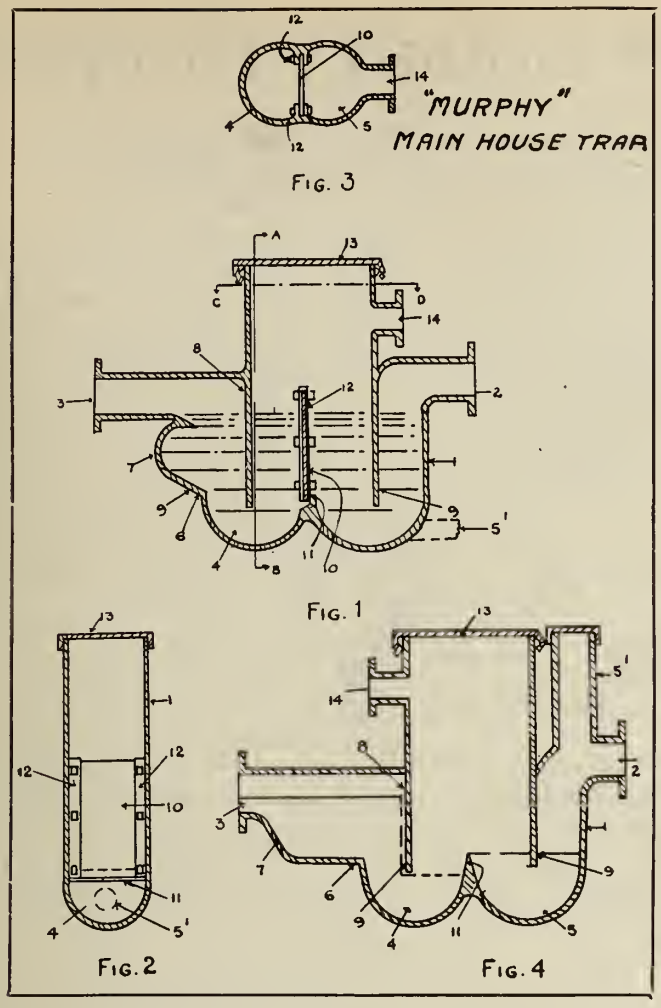
Just let me make one outstanding fact plain so that every person that is not a sanitary engineer will understand. Every city dweller, man or woman, knows that a water pipe leading to a tap which does not shut off tight will sweat in the warm weather until beads of water will run from it. This is caused by the humidity in the air settling on the cool pipe and the water continually passing through the pipe keeps it always cool. Again, every man that keeps a hen coop knows how hard it is in winter to keep open the vent which passes from such a coop through the roof to the open air. Every farmer, too, who keeps a properly ventilated cow barn or horse stable knows that the vents passing from such a building are continually closed in the winter, during very cold weather. Now, if the water pipes in our houses will collect the condensation from the air and if the vents passing from such places as are used for animals, cannot be kept open, how are we to keep a pipe which is continually open to the main sewers at one end and open to the cold frigid air at the other from choking with frost and condensation? When we consider that the air in the sewers is much more heavily laden with water than the air in the ordinary building, to say that such can be done is utter nonsense, and a man that will make any such claim simply tries to delude the public.

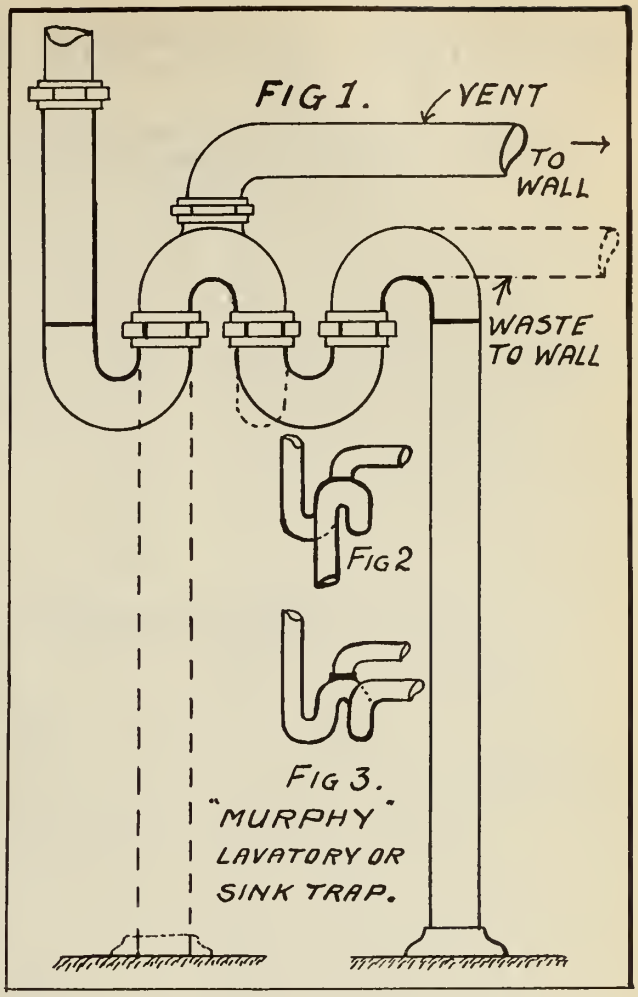
Mr. Allen makes a statement that no bona-fide engineer would protest against the Durham System. In this he is evidently at loggerheads with one of his own fraternity and, at that, the editor of a newspaper of sanitary science. The certainty of those things of which I speak can not be disputed and is brought to light by a lifetime of experience. Mr. Allen signs himself as coming from an institution in London, England. This fact alone is enough to prove that a great part of his life has been spent in England and that he cannot and does not know of the conditions in a climate like Canada. The system of ventilation and plumbing that would be a perfect success in England or any other temperate climate would be just as great a failure in Canada.— R. N. Murphy, 351 Lisgar Street.

It will be seen also that our friend Mr. Murphy is more interested in having an intercepting trap installed, as well as other traps, than in the kind of pipe to be used.

The accompanying illustrations show why traps are given most prominence in the above letter.

But here comes a reply to Mr. Murphy's letter, which finally appears to clear the air somewhat, though it does not go very thoroughly into the merits of wrought iron pipe. It does prove, though, that apparently the same interests have got under the hide of the United States Government, as similar interests are doing with the Canadian Government, and in this case the opposition to the use of wrought iron pipe is not due to ignorance, but because of real seeing and experience. The letter as a whole, however, is a very practical one,





and brings out some very practical points:

Who Is Right?

Sir:—I am afraid that Mr. Murphy missed the main point in my letter regarding the proposed system of drainage, etc., for the new Parliament buildings.

The main object was to point out that the practice of not installing an intercepting trap on the sewer is not detrimental to the efficiency of the system, but is, on the other hand, a decided advantage. It is the trap that I want to see left out.

I did not at that time intend to discuss the Durham system.

Now, apart from my own opinion on the merits of the Durham system, might I draw Mr. Murphy's attention to a report from the United States Government on this system. This report is apparently upholding the demand that the Durham system be used in all federal buildings. It states that much opposition has been brought forward to this system, from local sanitary engineers, caused mainly through ignorance. It is now being generally accepted as the best system to use.

This system is installed in the new customs building, also in the Chateau Laurier, without any defects coming to light, and I doubt whether this latter installation was constructed on the specification which is called for on the Parliament buildings.

However, this question of trapping and venting which is apparently the main argument in Mr. Murphy's reply, is not affected by the choice of drainage systems.

It would be too long a story to go into a discussion of the merits and demerits of the intercepting trap, but let me simply refer to an article in the last issue of the "Sanitary Engineer":

> Speaking on the recent convention of the American Society of Sanitary Engineering, many were there who favored the main house (or intercepting) trap, but they were the old guards in the profession.
>
> At the same time there were a greater number who were in favor of eliminating it.
>
> Those, however, who favored the trap do not appear to grasp the situation in its most logical and natural manner—but here is the point. We have a system of sewers, they need ventilation. If these sewers are not ventilated, then sewer gas will generate and accumulate. But suppose we ventilate the sewers?—we mean in other words, that the atmosphere in the sewers is being changed, renewed set in motion, etc.
>
> Now, in such a case, how in the name of common sense can such a sewer contain sewer gas?

Enough for the trap, now for the vent.

The parallels which Mr. Murphy draws in reference to the hen coop and cow barn do not impress me, as there is no comparison between these and a drainage system.

Did Mr. Murphy ever see a stack terminal choke with frost except above roof level? I doubt it.

The terminal only freezes when there is a length of pipe exposed to the cold air. Then obviously the remedy for this is to terminate the stack at roof level.

The results of the experiments, which were carried out by the Winnipeg committee of the Canadian Society of Sanitary Engineers, and published in the May, 1914, issue of the "Sanitary Engineer," proved this method to be effective so there is no attempt on my part to delude the public.

Apart from this, the same atmospheric conditions will prevail inside the pipes, whether an intercepting trap is installed or not.

Another essential point. Where did Mr. Murphy get the information that the drainage of the buildings is going to be connected to the city sewers? Let him pursue his investigations further and perhaps he will find that it will not be so.

This settles the objection to the buildings being the highest point, etc.

May I let Mr. Murphy into a little secret. Those traps he mentioned as not being vented are vented alright, and if he understood the subject he speaks of he would realize that the continuous system of venting is being used, which is the best system yet devised.

I certainly do maintain that it is the duty of someone to see that all traps are kept sealed, and suggest that Mr. Murphy name some system which would remain sanitary if the traps were allowed to become unsealed, also to name a system whereby the water of a trap will not evaporate.

Surely Mr. Murphy is not such a good sanitary engineer that he would cheerfully breathe drain air, and believe it harmless, if he knew that there was an intercepting trap on the system.

Does he not know that there have been found to be more bacteria to the cubic centimeter in drain air than in sewer air?

I think that Mr. Murphy could find more profitable use for his time by studying sanitation than spending it in cluttering up the architect's office on the hill with his presence in an endeavor to have the Murphy trap installed.

I presume that if this trap were to be installed, Mr. Murphy would be satisfied with any old system of drainage and venting at all.

Still for REAL sanitation,

A. WALTER ALLEN,
Assoc. R. San. Inst., R.P.C., Eng.
463 Sunnyside Ave., Ottawa.

Sewage Systems for Country Homes

As This Subject is Very Timely, and a Great Number of Farmers and Rural Residents are Having Sanitary Appliances Installed at This Season of the Year, the Following Article Will be of Particular Interest to Readers of Sanitary Engineer

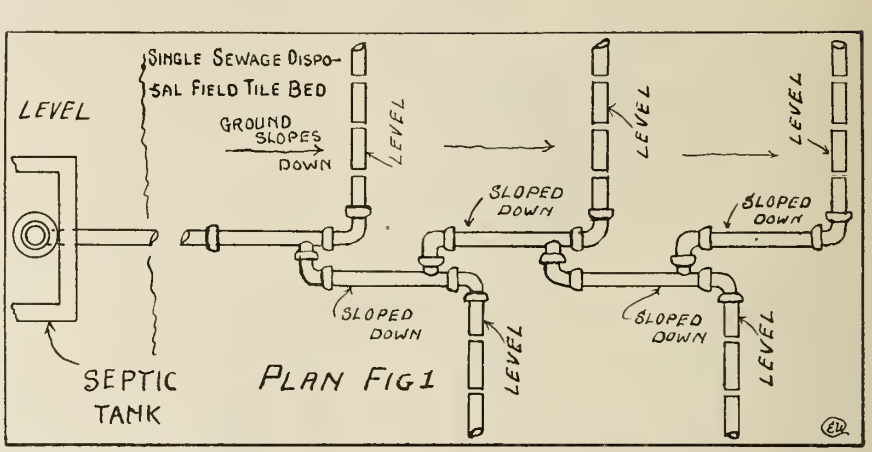
Article No. 2—See Sept. 15 for No. 1.

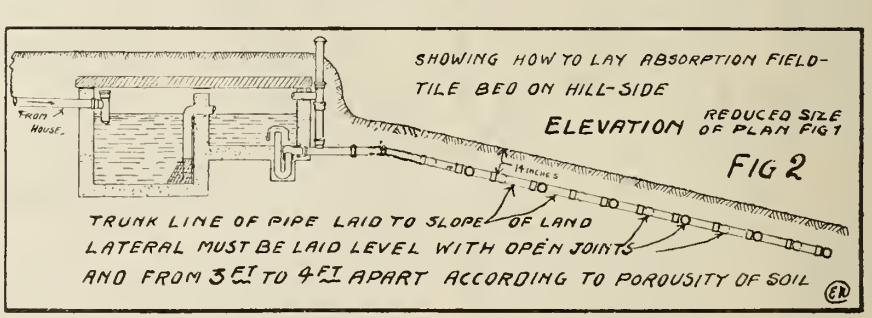
IN the Sept. 15 issue there appeared an article showing the layout of a small sewage disposal system suitable for six or eight persons, the field tile in that case being laid on a level piece of ground. It is very often necessary to lay the absorption bed on sloped land and no small amount of care is necessary when such is the situation. For example, if the pipes be laid to simply allow the sewage to flow down a main trunk line, relying upon the bottom pipes first filling, there would be a rush of fluid sufficient to lift the ground up, which would result in the sewage oozing out, or, if the ground were porous, it would become soggy and finally freeze in winter.

However, there need be no trouble if the methods shown in Fig. 1, 2 and 3 are followed out. Fig 1 shows what is known as a single system, the long T branch field tile pipes are laid so as to slope down in line with the slant of the hillside or ground in which they are to be laid. Then the laterals which consist of common field tile pipes are laid level, and at 90 degrees with the main trunk line of glazed tile pipe. It will be seen that the first line will fill up first until the trunk line is filled to T branch, the sewage will then flow down to next line of laterals in an opposite direction, until these are filled, when the sewage backs up, as it were, to the second T branch and fills up the opposite line of laterals, and so on until the whole system is full. Fig. 2 shows a septic tank, built level at the high point, preferably near the house, with the elevation of hillside and pipes showing. It will be seen that the trunk line follows slope of hill while laterals run from right to left.

In some cases the ground to be used for sewage disposal bed is inclined to be clayey, and requires a longer period to absorb the sewage.

Under such conditions, what is known as a double system of sewage disposal bed is preferable, so as to give one bed a rest, or more time to effect the absorption. This condition can be overcome by building first a small receiving chamber into which two valves are fitted. These may be made either of wood or iron in the form of gate valves. If the latter, the common smoke pipe slide damper usually to be found on top of hot water and steam furnaces, or the ordinary flap check damper can be used. The chamber, in that case, can be of cement and the valves cast in. If the outlets from the receiving chamber are in the bottom, a wooden plug in each bend will serve as a valve.





These valves may be operated by single lever fitted to the top of the receiving chamber, so as to be sure when one is open the other is closed. This lever mechanism will be described along with various types of valves and chambers, in the next instalment of these articles.

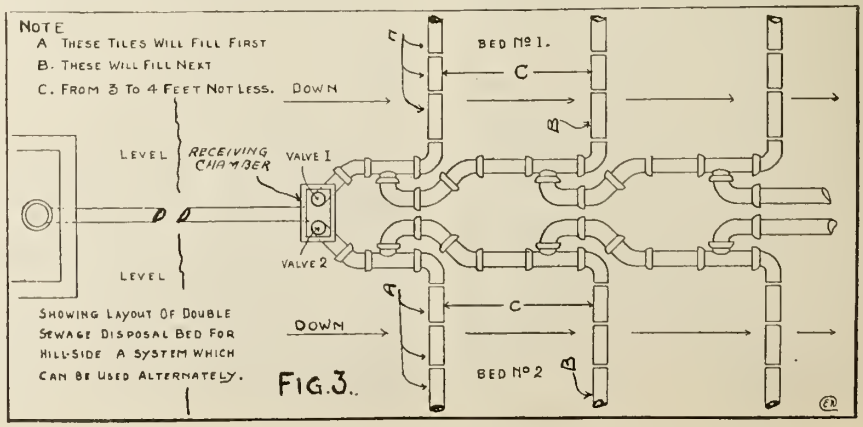
(Continued in a future issue.)

COAL GAS AS SUBSTITUTE FOR GASOLINE

(Continued from page 16.)

process, in the same maner as the ordinary gasoline vapor induction.

"The principal disadvantage to the use of coal gas for automobiles is the bulky container necessary for the gas. The use of gas for small cars has proved unsatisfactory by reason of the problem of adequate space for storage. A suitable cylinder for containing compressed gas is said to be necessary for the general usage of such fuel for motor cars, and the probability of the continued utilization of coal gas as a substitute for gasoline appears to depend upon facilities for storage or compression."



Main House Trap and Breather Problem

No Subject Has Proved More Interesting Than That of the Main House Trap and Breather—We Publish Herewith a Few of the Many Replies We Have Received in Answer to a Number of Letters Recently Sent Out.

EDITOR, SANITARY ENGINEER.—Regarding the question of main house traps, you will see, by the attached blue print, that the openings in the man-holes are not quite as numerous as is the case with most town or city man-hole covers.

But although I had the honor of designing the sewerage system in the town of Transcona and adopted the type of man-hole cover shown herewith, with a view of dispensing with the use of the main house trap and at the same time ventilate the sewers, I desire to explain that I have to disclaim credit, if there is any, for the design of this frame and cover. I first found it used about twenty years ago by Messrs. Lea & Coffin, consulting engineers, of Montreal and Boston, with whom I worked in years past as resident engineer. I do not know that it was designed by them. It may have been or may have originated from other sources and been adapted to their use, as it it has been in my case. Mr. R. S. Lea, consulting engineer, New Birks Building, Montreal, might be able to give you more accurate information regarding its origin than I can at present.

From the foundryman's point of view this is an easy cover to make. It comes out of the sand well and there is no difficult work on the pattern.

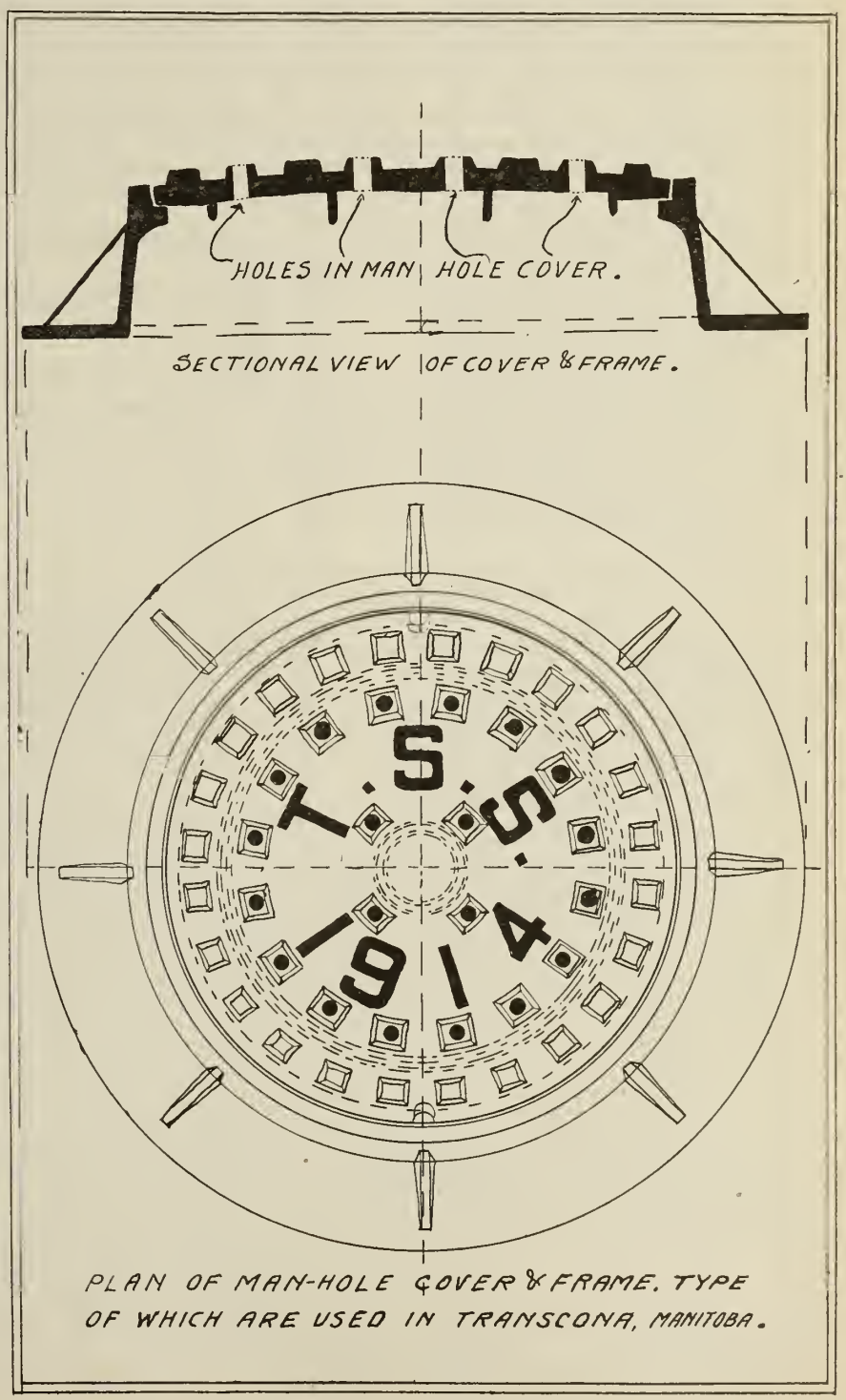
You will note that the air holes in the cover pass through bosses which provide roughness or grip to prevent animals from slipping. This, together with the curvature of the cover tends to let water pass off quickly and minimizes the entrance of mud and refuse through the cover into the sewer.

For this reason this cover has been used in many cases without a mud basket underneath it, which with many other types would be impossible. However, in a locality having the "separate" system of sewerage and unpaved streets I generally use mud baskets.

The above mentioned features of the cover are, in my opinion, of less importance than its adaptability for the proper ventilation of sewers.

Except in certain few cases, I think a trap on the main soil pipe outlet from building should be omitted, and believe the general use of the trap and its accessories cause nuisance and unnecessary expense. The most feasible and efficient method of providing ventilation for the sewer is through the soil pipe with outlet at the roof of building, drawing fresh air in through the man-hole covering. This cannot be done when the trap is used, notwithstanding foul air outlets and fresh air outlets which complicate and add expense to a plumbing installation. It is common to find these plugged up or to find a fresh air inlet placed under a window or at sidewalk level, which is really a foul air outlet. The air contained in system of soil piping shut off from the sewer by a trap is more dangerous than the air from a properly ventilated sewer system and the retention of the trap in mild and moderate climates indicates no progress in this particular feature of sanitation. In severe climates it has been found that without the housetrap the sewer, or connections from buildings to it, will freeze for a distance from one hundred to one hundred and fifty feet from a manhole, and because of this the trap is maintained.

(Continued on page 30)



PLAN OF MAN-HOLE COVER & FRAME. TYPE OF WHICH ARE USED IN TRANSCONA, MANITOBA.

A New Method of Estimating Radiation

Practical Working Rules, With Tables, For Using Common Heat Unit Method — Tables Showing Correct Heating For Various Kinds and Sizes of Buildings.

By Carleton F. Tweed, Chicago.

The second source of loss, the heat loss by convection, is probably the most difficult of these uncertain factors to determine. Many experiments have been made in an effort to obtain exact values, but only in specific instances have they proved at all successful. The authorities differ widely in this matter, some advise allowing enough heat for one air change per hour for ordinary living rooms, others think this is not enough and advise 1½ to 2 changes per hour. For first floor stores, etc., where outside doors are opened frequently, they advise 3, 3½ or 4 changes per hour. In the absence of personal data on this factor good averages may be obtained by using the number of air changes followed by the writer in practice.

I have used one air change consistently in estimating for hotels, office buildings, hospitals, residences, etc., that is for all buildings having small rooms set off by partitions. It would be only in the exceptional poorly constructed buildings that any more than this would be required. In very cold climates, where most buildings are fitted up with double windows, it is doubtful if one air change does occur.

For large open floors, as in a department store, one air change will be far too much; ½, or, perhaps, in an open floor of small area, ¾ of one air change would be nearer right.

In vestibules and entrance halls, 2, 3 or 4 changes may be allowed for, as a considerable amount of cold air will be forced in whenever a door is opened. The number of changes to allow for this depends on how frequently the doors may be expected to be opened.

Another somewhat uncertain factor is the extent of the greater radiation losses on the exposed or windward side of the building. In this country, the south side of the building usually gets the most benefit from the sun and is the least exposed to cold winds. For this reason, it is customary to figure all rooms as if they were on this side and then add a certain percentage of this loss when the room is on one of the more severely exposed sides of the building. The writer has always followed the German Government quotations in this matter with good results. These percentages are somewhat larger than the general American practice. They are given in Table III in the Practical Reference Tables.

When a room is more than 12 ft. high, the mean temperature will be somewhat above the temperature at the breathing line. To allow for this add about 1½ deg. for each foot in height above this limit.

When using the heat unit method in practice, the designer first selects the proper outside temperature on which to base his calculations. This is the most important of the uncertain factors and should be selected with the greatest care. The very extreme temperature recorded for a period of years would be uneconomical in first cost as the extra radiations so figured would only be required for a very few hours per year. The best satisfaction and economy will usually be obtained if a steady minimum temperature of 5 or 6 days duration is selected. Most of the modern systems so designed will stand being forced above their capacity for the very low temperatures of 1 or 2 days' duration which are common to all localities.

After the proper outside temperature to figure from has been selected, the designer determines the amount of heat lost from the room, and from this the amount of radiation required in square feet. To do this he will first sum up all of the radiation losses, add the amount he intends to allow for leakage, and then the percentage to be allowed for exposure if the location of the room makes this necessary. This total heat loss is then divided by the rate of heat transmitted, per square foot per hour, from the radiator to the room to obtain the size of the radiators. The general formula is:

Sq. ft. rad. = Total B.t.u. loss per hour ÷ [Kr. × (Temp. rad. — Temp. room)].

The accuracy of this formula rests with the value Kr. (the convention for heat transmission from a radiator or coil to air for one degree difference in temperature per hour per sq. ft. of surface). This varies with the initial temperature and also with the width, height, method of location, and condition of surface of the radiator. Table IV gives average working values for Kr corresponding to various differences in temperatures between the radiator and the room. The third line of figures give the B.t.u. per sq. ft. per hour for the number of degrees difference in temperature.

A common sense consideration of this table will show that the same value of Kr selected for steam heating ought not to be applied to hot water heating, as is advised in many text-books. When the room temperature is to be 70 deg., a steam radiator has a value for Kr of 1.63 B.t.u., while a hot water radiator has a value of 1.45 B.t.u. The error is 12 per cent., which is much too serious to be taken "approximately."

This tendency to approximate many of the factors is a common fault with users of the heat unit method. Oftener than not, it is done without intelligence and is carried so far as to render the method no better than an empirical formula. The modified system, however, is so simple that the fullest results may be obtained in record time without any undue approximations.

Wall Exposure	Multiplier	Wall Exposure	Multiplier
North	1.25	Northwest	1.19
West	1.13	Southwest	1.08
East	1.08	Northeast	1.16
South	1.00	Southeast	1.04

Table III. Percentage Allowed for Exposure.

T. Rad. -T-Room	165	160	155	150	145	140	130	120	110	100	90
Kr.	1.70	1.68	1.65	1.63	1.60	1.58	1.56	1.53	1.50	1.45	1.37
Kr.x(T3-T1)	280	268	256	245	232	222	202	184	165	145	123

Kr. = Heat transmission from radiator to air per degree temperature difference, per square foot, per hour.

T3 = Temperature of rad. T1 = Temperature of room.

Table IV. Heat Radiating Factor (Values for Kr.).

The writer would also advise the use of different values of Kr for the different heights and widths of radiators, as according to recent experiments there is as much as a 10 per cent. variation between 1 and 2 column, 15 per cent. between 2 and 3 column, and as much as 10 per cent. variation in different heights; further, pipe coils are about 50 per cent. more efficient than common radiators. Low radiators are more efficient than high ones (if of same depth) and narrow ones more than wide ones (if of same height). Enclosed radiators are also far less efficient than radiators exposed in the rooms. The values given in Table IV are about correct for a 2-column radiator, 32 in. high, exposed in the room.

The Modified System

The personal equation, all important in heating calculations, should never be neglected. Local conditions which often alter the factors somewhat should always receive consideration. Altitudes for instance, have different temperatures corresponding to a given gauge pressure. Further, the average temperature of the steam in any system is from 5 to 10 deg. less than the temperature at the boiler pressure. Many of the best designers now in the trade make use of a standard form on which they record the results of their calculations. These are undoubtedly of much value as they serve to facilitate the work of calculations, as a check over the work after it is in place, and as a future guide to the uncertain factors. The special form shown in the Reference Tables is a very essential feature of the new modified system.

As we should now fairly understand the principles of and the method of calculations necessarily followed when using the original heat unit method, we are ready to consider and will much more readily appreciate and understand the way in which this new modified system has been simplified from the original heat unit method without in any way approximating any of the factors. The system is still complete as it can be applied to any and all conditions of heating.

Two tables, I to be used for steam heating, and Table II for hot water heating, have been prepared. These give values for a new "K" factor which has been termed KRs for steam systems and KRw for hot water systems.

This factor is simply the amount of radiating surface in square feet necessary to compensate for the heat lost through one square foot of heat transmission surface per hour or also the amount necessary to heat a certain amount of air from the outdoor temperature to the room temperature. As used here the factors for air range from ½ to 3 cu. ft., according to the number of air changes to be allowed for. Expressed as a formula for heat transmission surface,

$$\text{KRs or KRw} = \frac{K\ (T1—T2)}{Kr\ (T3—T1)} \times 1$$

wherein K and Kr are as quoted before, and T1 = mean room temperature, T2 = minimum temperature allowed for outdoors, T3 = mean temperature of the radiator.

As a formula for air

KRs or KRw = H × number of air changes per hour ÷ [Kr × (T3 — T1)]

wherein Kr, T3 and T1 have the same value as before and H = B.t.u. required to heat one cubic foot of air from the outdoor temperature to the room temperature.

Values of K for various kinds of exposed surfaces are given in the first column of either table. Values for Kr should be taken from Table IV. Later a simple method for correcting this to allow for the different widths and heights of the radiators will be explained. Values of H may be taken from Schrams table of the B.t.u. required for heating air, which will be found in many of the reference books and trade catalogs.

Tables I and II have only been calculated for convenience and cannot be applied to all conditions. They have been calculated to suit the more common of the average working temperatures which are found in ordinary practice. These temperatures have been found to be as follows: 220 deg. as the average in a steam system carrying steam at 2 to 5 lb. gauge pressure,—sea level,—170 deg. as the average for a hot water radiator on a gravity system and 70 deg., which is the temperature usually maintained within heated rooms in this country. The values of Kr in Table IV corresponding to these temperatures are—for steam at 220 deg., 1.63 B.t.u., and for hot water at 170 deg., 1.45 B.t.u. Using these figures 5 different values have been calculated for KRs and

(Continued on page 32)

HEATING SCHEDULE

Date — Job No. 15 Sheet No. 1

Building - J. D. BROWN - RESIDENCE — Location - MINNEAPOLIS, MINN.

Based on outside temperature of - 30° — FIRST FLOOR — Calculated by - C. F. TWEED

Required room temperature - 70° — Checked by - C. F. TWEED

No. of air changes allowed - ¾ in living rooms, 2 in hall — Ceiling height - 12'-0"

Construction of walls - 12" brick, furring space, plaster — Window height - Varies

Construction of windows - Double — Stool height - Varies

Construction of roof - — Method of heating - Direct Hot Water

B.T.U. per sq.ft. radiation (Kr(T3 - T1) = 145 — Method of ventilating

Total sq.ft. radiation, this floor = 75.3⅓ — No. of radiators

Equivalent sq.ft. radiation 145 B.T.U. per sq.ft. = 750

Room No.	Name of Room	Dimensions of Room	Volume Cu.Ft.	Wall Sq.Ft.	Glass Sq.Ft.	Roof Sq.Ft.	Factors	Radiation Sums		Exp. Factor	Corrected Size	No. of Rad.	Standard Size	Final Size	Remarks
100	Living Room	20×31×12	7500	640	212		.0114 .138 .346	86 88 73	247	N.W.S. 1.13	290	4	2c-32" 1.00	73½ ea	
101	Hall	18×15×12	3240	111	105		.0304 .138 .346	98 15 35	148	S 1.00	148	2	2c-38" 1.00	76 ea	Door = to glass
102	Toilet	6½×5½×12	362	51	15		.0114 .138 .346	4.1 7 5	16	S 1.00	16	1	1c-26 0.86	14	On brackets
103	Dining Room	13×19½×12	3040	162	128		.0114 .138 .346	35 22 44	101	S.E. 1.04	105	2	13 R.W. 1.10	57 ea	High legs
104	Pantry	9½×11×12	1250	188	58		.0114 .138 .346	14 26 20	60	N.E. 1.17	70	1	2c-45" 1.00	72	
105	Kitchen	24×15½×12	4460	190	98		.0114 .138 .346	51 26 20	97	N 1.25	121	2	2c-22" 0.90	36 72	
Totals									669	1.12	750	12	1.00	753⅓	

Importance of Humidity to Health

Being the First of a Number of Articles Showing the How and Why of Humidity — Sanitary Engineers Should Read These Articles and Thereby Profit Much.

Written specially for "Sanitary Engineer" by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

Article II

"It's chilly here, Jack. Guess I'll put some water on the stove.

"Put some what?" says Jack. "You must be dreaming, Bill. You mean wood."

"No, I don't. I've finished all the old magazines that were lying around this shack and now I've just been reading over some of those advertisements and things that fellow forgot and left here last summer. Listen to this—'The lack of humidity or moisture causes much discomfort, ill health, catarrh, colds and other diseases of the mucous membrane' —now what on earth is that, Jack? 'If we had the proper percentage of humidity in our homes in winter we would not only be more healthful and comfortable but we would also save from 12½ to 25 per cent. of our total cost of heating.' I don't quite get all that but us for this moisture business if we can save some wood, eh?

"Here's another one that says:—'Dry heat (without a proper percentage of relative humidity) will sunder the best work of the cabinet maker, destroy the finish of fine furniture and in time ruin the greatest works of the old masters, particularly paintings'. We're not burdened in this two by four shack with an enormous amount of baby grands, expensive furniture and pictures but this guy tells you how to get the humidity stuff over,—'The remedy is to maintain the indoor humidity at a proper point, about 50 per cent. This can be simply done, in cold weather, by boiling water somewhere in the house to moisten the air. keeping the temperature at 70° F., and having a reliable and simple instrument to tell you when you have obtained the proper percentage of humidity.' Now I'm going to boil some water on this stove just to see if I can get warm, save the wood and keep you from 'much discomfort, ill health, catarrh, colds and other diseases.' In return you may play the part of the reliable and simple instrument to tell us when we have obtained 'the proper percentage of humidity.'"

Thus spoke and joked Bill to his bachelor chum in the wilds one winter before the war. A hot argument followed as to the possibility of saving fuel by boiling water and thus moistening the air. In the literature that had been left them they found reasons given why moist air could be considerably lower in temperature and yet feel more comfortable and be much more healthful in every way than highly heated dry air. But they were much more interested in such statments as this—"Burn water instead of coal. Reduce your coal bills. Promote comfort and enjoy health" and "As water is cheaper than coal, its use should become popular as a heating agent." Jack contended that to boil water required considerable heat and it would probably take as much wood to do this as would be used otherwise to directly heat the shack to a higher temperature.

To carry on the story it might be explained that while the question of the amount of fuel used was a bone of contention the keeping of a kettle of water always on the stove was found to be a great improvement that winter as regards health and comfort even to these hardy and—hoping they have now successfully served their turn—entirely fictitious bachelors.

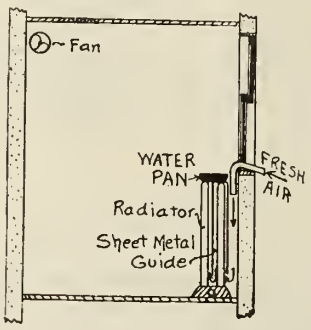


Fig. 6.—Heating Ventilating, Humidifying.

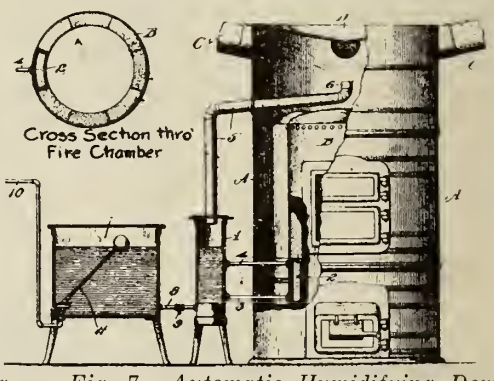


Fig. 7.—Automatic Humidifying Device (Hot Air Heating).

Some time ago a successful business man in one of our thriving Canadian cities who spent many of his winter evenings at "auction bridge" noticed what he considered a rather remarkable coincidence. As a rule he felt tired or drowsy at the close of a long evening's play. But there was one home where he always felt as fresh at the end of the evening as when he arrived. At last he mentioned this to his host who said—"That's easily explained" and led him down to his furnace.

It was a hot air furnace but a humidifying device had been added which supplied fresh, warm, moist air to a register in a convenient location and from there it diffused to the various rooms. Our business man was very much impressed and immediately looked up the sanitary engineer who had installed the apparatus. "It will save you from 12½ to 25 per cent. of your coal bills" or words to that effect, says the sanitary engineer. "I don't believe that" or words to that effect says the business man who believes you can't get something for nothing these days, at any rate in the heating line. "But I want that apparatus in because I believe it will add to the health and comfort of my office." That's a year ago and after last winter's trial that man is as enthusiastic as ever.

If it be assumed that a temperature of 65° F. and plenty of moisture will make one feel as warm as a temperature of 75° when there is a lack of moisture in the air, then the problem is, does it take more fuel to heat the air from 65° to 75° than to heat sufficient water to supply enough vapor. Such a problem cannot be definitely solved without knowing many factors in each particular case, such as the outside temperature and humidity, the character of the building, the kind of heating device used, what heat losses are occurring, etc.

To change one pound of water into vapor takes approximately 1,000 B.T.U. (British Thermal Units), a B.T.U. being the amount of heat required to raise one pound of water one degree Fahrenheit at normal temperature. To raise one pound of water from freezing to boiling point only takes about 180 B.T.U. but to then change it into vapor or steam takes 966 B.T.U. This latter amount is known as latent heat because the temperature remains at 212° F. during the operation. If steam changes back to the liquid form this heat would again be given up to surrounding objects. In an eight-roomed house it has been stated that at least 10 gallons of water per day should be evaporated in the winter time for a healthful moisture. Now 10 gallons of water would weigh 100 pounds and would require therefore 100,000 B.T.U. to evaporate it. One pound of coal in burning produces about 8,000 effective B.T.U. Then 100,000 divided by 8,000 equals 12½ pounds of coal per day needed for this purpose. If on the same day one would burn 100 pounds of coal in keeping his house

warm and it is admitted that if he had plenty of moisture he could reduce the temperature 10° F. and save from 12½ to 25 per cent. of his fuel then his saving on that account would be from 12½ to 25 pounds of coal per day. Now taking into account the 12½ pounds of coal required to produce this humidity or moisture we can say that at least no extra fuel is needed by this arrangement and some fuel might possibly be saved. If in the ordinary furnace a certain amount of heat is ordinarily wasted and this waste heat can be utilized in evaporating the water, then of course there could be a substantial saving in coal effected.

But the reason sufficient moisture in the air is to be strongly advised and urged is not because it may save fuel but because it is an absolute necessity from the standpoint of health. It is as necessary to have a proper amount of humidity as it is to have enough heat. In subsequent articles this phase of the matter may be treated more fully but the point has been emphasized again and again by doctors, scientists and engineers.

Admitting the necessity for adding moisture to the air supplied in winter

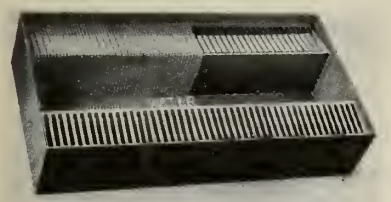


FIG. 1 – THE BUDDINGTON HUMIDIFIER

to our homes the question arises how can this be most conveniently accomplished. There are two ways of forcing water vapor into the air. Water always tends to evaporate into the air and one method is to aid that evaporation. The most positive way is to heat water to the boiling point when it must all change into water vapor, termed steam at that temperature.

There will now be considered some methods employed in forcing the evaporation of water at temperature below the boiling point of water (212° F. at sea level).

The Evaporating Pan

Pans placed on stoves, radiators (see Fig. 6), hung to register faces, etc., where the heat supplied is below 212° F. certainly aid in moistening the air but generally not to any greatly appreciable extent.

The Buddington Humidifier

This is an evaporating pan but so designed as to allow of considerable evaporation. It can be attached on top of the coils of either flat or round top radiators. Fig. 1 shows the humidifier with slotted cover removed. Its appearance on top of a radiator is not by any means unsightly (see Fig. 2). It offers a large evaporating surface and is easy to keep filled with water.

The Buddington Humidifier consists essentially of a water pan, with patented, perforated wings, (patented 24th March 1914), over which pass specially prepared cloths. As one end of the cloth is in the water pan, that part of

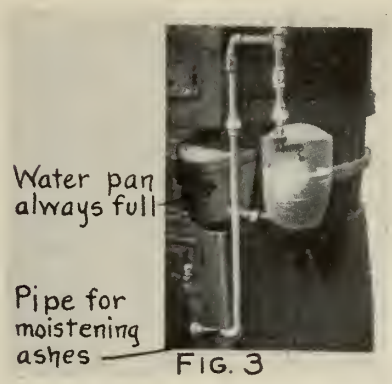
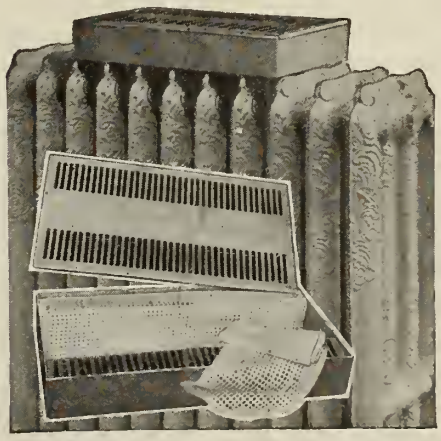


FIG. 3

it which passes over the wings is always wet. As the air from the furnace or radiator rises, it passes through the perforations in the wings, comes in connection with the moist cloths, takes away a certain amount of moisture and passes it into the room.

The Water Pan in a Hot Air Furnace

It is a notorious fact that from the water pan as installed in the ordinary hot air furnace there cannot be obtained sufficient moisture for the heated air. It has been stated that at least 10 gallons of water per day should be evaporated in an eight roomed house in the winter. Most water pans hold less than half that amount and it takes several days to dispose of all the water by evaporation. Probably the average home gets 2 gallons of water evaporated and diffused, instead of the necessary 10 gallons. Not needing to be filled every day it often happens that the furnace attendant lets this pan go dry, making a bad matter worse.



The Buddington Humidifier.

The "Moistair" Furnace Automatic Humidifier

Fig. 3 shows how the water pan is automatically kept full of water which comes to the float chamber under city or tank pressure. The pipe extending to the bottom of the furnace provides a means of moistening the ashes before removing them thus avoiding dust.

The manufacturers claim that the water pan is very favorably located to allow of sufficient moisture being evaporated. "It is not placed in the casing or at the side of the ash pit, but it is located right next the fire pot."

In any event the automatic filling of the water tank and the ash moistener are features worth noting.

MUST CONNECT WITH SEWAGE SYSTEM

The time has at last arrived when the people of Burlington, Ont., must connect their dwellings with the new sanitary sewer. The system is practically complete now, and the work of installing the street connections has been in progress for some time. At a recent meeting of the board of health, an order was passed instructing the townspeople in general to have their places connected. In default of this, within a certain time the water connection will be severed. This means that all septic tanks, cess pools and the like, will have to be discarded immediately. It is also understood that this move will also result in the elimination of the nuisance due to the emptying of raw sewage into the lake, which has occurred more than once since the sewage system was commenced, and concerning which a complaint was received by the council from A. B. Coleman quite recently.

MANY HOUSES WITHOUT SEWERAGE

The report of Sanitary Inspector Rooney shows that there are 1,800 houses in the city, St. John, Nfld., without water and sewerage connection and in these are living about 10,000 people. While some of these houses are fit for installation others are not and moreover occupants are in the financial position to meet the cost. The inspector submitted a list of houses in the principal streets which were without water and sewerage facilities, the owners of which had not complied with the instructions sent out by the Council some two years ago. Mayor Gosling will hand the matter over to the City Solicitor and instruct him to carry out the law.

THE EXCUSE

The poor cripple thumped his crutch on the ground and said to his lawyer:

"Merciful heavens, man, your bill is outrageous! You are taking four-fifths of my damages! I never heard of such extortion!"

"I furnished," said the lawyer, boldly, "the skill, the eloquence, and the legal learning for your case."

"Yes, but I," said the client, ruefully glancing at his injuries, "I furnished the case itself."

"Bosh!" sneered the lawyer. "Anybody can fall down a coal-hole."

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SKILLED MECHANICS A POST-WAR NECESSITY

THERE is a growing disposition to recognize that the peace-time essential of this or any other manufacturing country will be its muster of skilled mechanics. Shell-making has not, as is perhaps too generally believed, contributed materially to Canada's pre-war quota of the latter for, with the exception of a fair percentage increase, comparatively, in the ranks of her tool-makers and equipment designers, the abnormal activity of the past thirty months has done little more than demonstrate the possibility of rapidly training as attendants men who to all intents and purposes were in the rough so far as machine tool operating knowledge was concerned.

Shell manufacture was highly specialized, but in the nature of things was quite temporary in character. Urgency of production by the most direct means available was the keynote of the whole enterprise, as a consequence little opportunity was afforded for a widespread development in the training of expert mechanics, men who in the coming time would give our metal-working industries the degree of backbone and vigor which will undoubtedly be required if we are to procure and maintain a foothold in the world's markets. With the cessation of shell-making, attention is naturally being focused on lines of product that will provide capacity activity for our now enlarged plant establishment, while giving at the same time assurance of there being retained in steady and continuous employment the skilled men now possessed, as well as providing opportunity for materially supplementing their numbers.

It should be borne in mind that, despite the war activities now so pronounced in the United States, and those no less in evidence in Great Britain and elsewhere, the keenest interest is being displayed in the matter of post-war trade preparedness, and that recognition as never before is being taken of the thoroughly trained and expert mechanic as the principal factor in the conditions with which we will be confronted. As an indication of how the subject is viewed in the Old Country, the following paragraphs culled from a recent editorial in our contemporary, *Engineering,* may not be without interest to our metal-working plant executives:

The deficient supply of skilled men is acutely realized and is exercising the minds of all who employ mechanics.

A man having the mentality, dexterity and character taken for granted or implied in the term skilled mechanic, or competent all-round craftsman, is prima facie a competent individual in a much wider manner than in a purely trade sense.

Natural aptitude, large mentality, resource, initiative, grit, character—all matters which make a man worthy of respect—are the inalienable possession of the man who becomes an expert mechanic.

Good mechanics were never plentiful, but present-day conditions have separated all men into two classes, those having skill and those without. Consequently, there has been a remarkable appreciation in value, the intrinsic worth of real skill has never been so realized as now. It is contended that, unless steps are taken to enable men to acquire real skill, invention will be paralyzed, improvement will be forfeited, and business some time or other will have to be rebuilt upon its old foundations.

How can we have mechanics unless we deliberately set out to produce them. Modern tendency is to commit industrial suicide. There are two outputs going on simultaneously from any business, products and men; the former earns profits, the latter serve a national as well as an industrial end. Plant can be extemporized more rapidly than skill, but if the result is to materially reduce the production of skilled craftsmen, then the industry must ultimately be penalized.

Academic training alone is no substitute, since it cannot produce the practical man of experience nor can it give manual dexterity of a high order. If the industry takes no steps to foster one of the most inherent of human desires—skill in the use of tools—it is going to decay and not to progress. Moreover, the nation which does not produce skilled craftsmen is going to forfeit industrial pre-eminence.

WROUGHT IRON vs. CAST IRON FOR SOIL, WASTE AND DRAINAGE PIPES

ON another page of this issue will be seen a letter from the Sanitary Committee of the Toronto Society of Sanitary Engineers embodying a report which contains further irrefutable arguments in favor of cast iron piping for soil, waste and drainage. There is no disputing the fact that wrought iron, many as are its uses for other purposes, is not the material best adapted for the purposes referred to.

The fact that a large number of architects or experts have issued specifications calling for wrought iron pipe proves nothing except that such architects and experts know very little of the sanitary end of their business.

When the wrought iron piping was installed in the Waldorf-Astoria Hotel the opinions of these so-called experts were proclaimed far and wide, but where do they stand now? When wrought iron was installed in the Chicago City Hall, the fact was emblazoned all over the continent that *wrought iron was an improvement on cast iron, etc.,* but where is it to-day? And what is the condition of the piping? On the other hand, where is there a single length of cast iron soil pipe in a state of decay?

What SANITARY ENGINEER stands for is the employment of the right material in the right place. The statement that such and such a man specified this or that is no evidence that what he specified was the best for its purpose. We hold no brief for either kind of piping, we are fully open to conviction, and if any advocate of wrought iron will produce proof of a case in which wrought iron piping, black or galvanized, has been in use for as long a time as cast iron has been shown to be under similar conditions we are prepared frankly and freely to admit our error and to cry "peccavi."

We are not living for pelf alone, we should have a principle to live and fight for. Our boys at the front are fighting to make this world a better place to live in, fighting for a principle, against Prussianism. SANITARY ENGINEER is fighting for the uplift of our craft against anything that has not proved by past experience to be beneficial to it. There are just as good flesh, blood and energy in the Prussians as in other nations, but they are misapplying these materials. So it is with the manufacturers of wrought iron pipe when they try to sell such material for an improper purpose in spite of all that time and every-day usage has proved.

Let these same men look the matter in the face, be consistent with the laws of Nature, work hand in hand with that law and apply their energies in a proper manner and their efforts will be well rewarded. We should be and are proud of the great strides made by those who have worked in the wrought iron industries, they have done wonders, but so have the Germans, until three years ago. No country under the sun was as well thought of as far as research work, and the application of all manner of means towards perfecting things mechanical and otherwise, and even in Germany we find more substitutes for the genuine than in any other country in the world. Let us, therefore, in the sanitary engineering trade, stand out for the employment of those things that have been proved to be most efficient and refuse to use substitutes.

ACCIDENT PREVENTION

CONSERVATION of life and energy has probably never before been so deeply impressed upon our minds as now. The need of preserving and protecting humanity from the risks of permanent or temporary disablement, arising from industrial activity, has been much emphasized by the knowledge that the past three years has shorn us of much of that man power which is so indispensable to our national development in the arts, crafts and manufactures. What may tend to increase the possibilities of accident, and likewise the responsibilities of the employer and the employed, is the advent of woman labor into the ranks of metal-working plant operators. While the likelihood of accident may be no greater in one case or the other—the female than the male, the fact that the so-called weaker sex must inevitably take a prominent part in post-war development, should be a stimulus to those concerned, to eliminate, or at least constrict the opportunities for injury that have ever been incidental to most phases of manufacture.

While safe-guarding methods and devices are deserving of just commendation they should never be wholly relied upon as an infallible proof of non-liability to injury. No proposed or adopted method of operating or guarding machine mechanisms should be termed fool-proof, even though it has been amply demonstrated that it is practically impossible to tamper with or destroy its intended purpose. The mere statement that a thing is fool-proof implies that it is proof against a fool's meddling, and any fair-minded person would or should resent the implication. It is invariably within the power of the workman to "make" or "mar" any new innovation—providing its effectiveness is being tried for the first time.

It does not pay to "force" protection on factory employees, but it does pay to have them realize the many advantages that are to be derived by adapting themselves to the changed conditions. Some men unfortunately become easily prejudiced, and will for a time do all in their power to deter rather than assist such methods as are advanced for their own welfare and protection. No safety or protective device can be entirely successful without the absolute co-operation of the employees it is intended to serve. If a safety method has any outstanding advantages —and few have not a fair proportion, it should be the duty of the workman to adapt himself as rapidly as possible to the conditions which it imposes, because eventually he will be the chief beneficiary.

Toronto Society Discuss Pipe Question

Consensus of Opinion in Favor of Cast Iron — Differences in Rust Explained — Interesting Instances Quoted—For Durability and Low Cost the Cast Product Preferable.

THE TORONTO SOCIETY OF DOMESTIC SANITARY AND HEATING ENGINEERS

22 College St.,
Toronto, Ont.
October 2, 1917.

Editor SANITARY ENGINEER,
147 University Ave.,
Toronto, Ont.

Dear Sir,—In reply to your recent communication, I wish to inform you that the Sanitary Committee of the above Society are holding a meeting on October 4 at 3 p.m. in our room, to take up the question of Wrought Iron vs. Cast Iron, and if at all possible your presence on that occasion would be greatly appreciated.

I also beg to request your presence at our next regular meeting to be held on Wednesday, October 17, at 8.15 p.m. in the Canadian Forester's Hall, 22 College St., to address the members on the question of Cast Iron vs. Wrought Iron, as arranged for at the last regular meeting. Kindly let me know as soon as possible if same is satisfactory to you.

In reference to the advisability of using cast iron as against wrought iron for plumbing installations, I take much pleasure in placing the following deductions in the matter before you, same being the consensus of our Sanitary Committee's investigation to date. Further particulars are being secured and as compiled they will be forwarded to you.

This question, aside from the commercial aspect of length of time for installation, appearance of the work when completed, etc., resolves itself purely into a question as to durability of cast iron as against wrought iron under present day structural conditions.

It is our contention that pipe made in a rolling mill does not resist corrosion in service so well as that made in a foundry. Both kinds of pipe may have been made from the same quality of iron ore, both are smelted, and both may have been treated in the same manner up to a certain point in their refinement known as the pig iron stage.

The iron which passes through a tube mill must first of all be rendered comparatively free from carbon, silicon, sulphur, phosphorus and manganese before it can be manipulated into thinly rolled sheets for the purpose of making wrought iron pipe.

Pipe made of cast steel lasts quite as well as ordinary cast iron in service, but conversely the pipe which may have been rolled out on a cast iron ingot lasts not one-tenth as long as the cast product, this being due altogether to the process through which the metal goes in making all wrought pipe. The effect of rolling and re-rolling is very noticeable under the microscope. It is nevertheless the contention of a good many authorities that both wrought iron and steel pipe last approximately the same under like conditions of service.

A bar of metal which is rolled or drawn cold will present an entirely different photo-micrograph than the pipe made from wrought iron made at a final heat treatment at approximately 1,200 Fah.

Harry Y. Carson in his article on the rusting of pipe in service contends that the extraordinary qualities of cast iron pipe and of cast iron fittings can best be explained on the basis of heat treatment. He states that it is the only responsible explanation that seems to coincide with all the observed corrosion phenomena which are incidents in the rusting of pipe in service.

If it were possible to summarize all the painstaking research that has been carried on since the year 1800, we would probably find that one common point has always been mutually agreed upon, and that is that the iron particles must be in direct contact with oxygen and moisture before rusting can take place.

There is an entirely different kind of surface rust formation on cast iron pipe than is to be found on the surface of a pipe made of rolled iron or steel. On the surface of a cast iron pipe there may be observed a reddish brown colored iron oxide which is very hard. On the other hand on the wrought iron or steel pipe we may observe a loose scaling formation of rust, which is soft and permeable to moisture and oxygen. These flakes of rust are very readily removed with a penknife, and once the scale rust drops away, the fresh bright particles of iron are again exposed to the oxygen and moisture. when the rust formation again takes place.

The New England Water Works Association received an excellent report on service pipes, in which the data received covered plain iron or steel pipes, and showed that an average of twelve years took place before trouble began in the iron or steel pipe, and that the life of the pipe was sixteen years. It was also found from their data received that the life of galvanized pipe was twenty years, showing that galvanized pipe is little better than ordinary black iron.

The examples are numerous where cast iron has resisted the elements of wind and rain for more han one hundred years. Example is quoted such as the links of the suspension bridge at Newburyport, Mass., which are still in excellent condition. Some experts claimed that this was due to the inherent superiority of the metal, but this question was settled by heating and rolling one of the links into a sheet, and exposing it to the weather, when it was found that it corroded quite as readily and extensively as the rolling mill product of to-day.

Looking at this question from a practical standpoint, it was advisable to secure data where the relative merits of the two metals may be considered from a standpoint of length of service. As stated in an article in The Financial Post, September 15, 1917, cast iron soil pipe has been in use for over eighty years in New York. When the old Astor Hotel was pulled down, cast iron soil pipe was removed after being in use for eighty years, and found practically as good as new. In contrast at the City Hall, Chicago, wrought iron pipe is in a dreadfully corroded condition, and has only been in use for about ten years.

There are other numerous examples that might be noted, but we are satisfied that for durability, cost of materials, and a sound, sanitary condition of installation, it is more desirable to use the cast iron pipe for waste, vent, soil lines, leader lines, house drains and house sewers.

Once more wishing you and your worthy journal the utmost success and assuring you the continued support of the Toronto Society of Domestic Sanitary and Heating Engineers, I remain,

Yours respectfully,
(Signed) Garrett F. Frankland,
Secretary.

WANTS A GENIUS OR A "JACK OF ALL TRADES"

Mayor Todd of Victoria, B.C., thinks that the electrical wiring inspector, the plumbing inspector and other officers produce very little work for the time they put in and the pay they receive.

"The situation in the city at present is that we have got to let men go one after the other," said he.

If such is the case why not use the plumbing inspector's spare time in making inspections of all plumbing at least once a year. Let him see that all W. C. tank valves are in good order, that taps are not allowed to leak water for want of repairs. Inaugurate an annual inspection of all plumbing and allow the plumbing inspector to advise the citizens, check up repairs for them, thus cut out any botch work that is palmed off by men who do not know how to execute repairs properly.

There must be some such work done unless Victoria is an exception to the rule of Canadian cities.

Now Time to Study Business Insurance

Take Time by the Forelock in These Days—Make Sure That You Establish a Sinking Fund for Future Development—Do Not Encourage Business Expansion by Increasing Liabilities.

By Henry Johnson, Jr.

RIGHT now I want to induce you to give serious consideration to the question of Business Insurance.

What is business insurance? At the risk of having you turn the page without reading further, I'll tell you: It is **saving money and putting it away where it will accumulate.**

Now, you'll miss it if you do not read further—take my word for it. So let's get the outline first and tell the why afterwards.

The scheme is to provide for business expenses only, as a starter. Determine what you must keep each month with which to pay your rent, help, heat, light, etc. Then settle on a certain minimum sum which you will take out and put away **before any profits are figured, before you take out any "spending money," before you pay your bills!** Get that last: BEFORE YOU PAY YOUR BILLS.

Begin small. Take as little as $5 per month for a beginning, if you do not feel sure you can take more. But make it $10 or $25, or more if possible; and remember that this system is going to make a lot of things possible for you that hitherto have been in the "Can't-be-done" class.

Never Reduce—Never Quit—Never Withdraw

The idea is that the beginning must be modest because the most fundamental point is that money once saved must not be used again—except as I shall indicate later on—and, though you will gradually increase the monthly savings, you must live up to the new schedules whenever you make the sum larger. For the keystone drops out the minute you permit yourself to backslide.

Whatever the sum fixed upon, take it out of the safe first thing on the first business day of each month and deposit it in a separate savings account. So entirely separate must it be from the rest of your funds, that it is well to use a separate bank for this account. Never mind the interest now—let it be 3%, 3½% — the present point is to accumulate it. **And every cent of interest earned must be redeposited to accumulate with the capital.**

And note this: It's no matter whether your bills are paid or not. Pay no attention to any other obligation on that first morning of the month. Do nothing, think of nothing, keep your mind free and clear of all other things until this particular money is drawn out and put away.

The benefits are almost beyond computation. Here are a few:

First, there is the accumulation itself, which grows wonderfully. Just how wonderfully may be sensed from the fact that as little as $25 per month thus put away at an average of 6% compound interest will yield just about $30,000 in 30 years—a comfortable competence for the merchant 30 years old to look forward to when he's sixty. In other words, **the saving of $9,000 during those years, at $25 each month, will produce $30,000—$21,000 of it earned for you by somebody else!**

Second, you are kept scratching for funds. You return to your store and every bill you have stares you in the face. The effect is surprisingly sobering. It makes you think seriously and figure closely on every purchase you make. You invest neither in merchandise nor in "improvements" of dubious value or utility. Better have the money in a business-insurance fund than tied up in a lot of fancy fixings which often are merely in the way.

Become Brisk, Insistent Collector

Third, you become a keener collector. You are actually more sincerely in need of funds and therefore more convincing—because you do need the money.

Fourth, you have a constantly growing sense of security, of power, of **independence,** because your bulwark of financial fortification is growing higher and more substantial every month.

Fifth, you feel that you are working for yourself. You are making tangible progress. You are gathering real money. You are absorbing the most vital lesson that can get lodgement in any man's consciousness; that the one way to make real money is to take money out of your business steadily.

AND THIS CAN BE DONE BY EVERY BUSINESS MAN NO MATTER HOW HE IS SITUATED, NO MATTER HOW SMALL HIS BUSINESS, NO MATTER HOW MODEST THE SUM ACCUMULATED MAY BE. IT IS THE DUTY OF EVERY BUSINESS MAN TO DO THIS.

Benefits Summarized

To summarize the benefits, we have:

1.—The money safely put away.

2.—We buy more conservatively.

3.—We become more effective collectors.

4.—We have SECURITY — Business Insurance.

5.—Working now for ourselves we acquire **Independence.**

And there are any number of collateral advantages. Ask your jobbers. Ask your banker. Take note of the tone of enhanced respect with which each will listen the minute you suggest what you have in mind.

Why, bless your old heart! Financial independence, competence, everything worth working for lie in this direction and only in this direction when all is said and done.

The Next Step

Suppose, now, that you have piled up $100, $200, $300. On the first interest day, draw out what may be needed to buy solid bonds. The first you buy should be the solidest—war loan bonds are ideal at this moment.

Because those are the soundest, safest security that can be found anywhere. Buy 'em. Put them into your safety deposit box. Then the bank can "bust" and most other things go to thunder—your money will be secure.

Next, accumulation should go into bonds of second line convertibility. Such will yield 4½% to 5%. Buy those until you have, say, $2,000 to $10,000, depending on your own circumstances. (You will be able to take care of yourself after you have bought a few bonds with the advice of your banker.)

Third, buy bonds of narrow market, but sound. These will bear 5½% to 6%. In some cases bonds bearing even 7% can be bought safely—only be sure of the house from whom you buy.

Then follow small mortgages, which in the west pay 7% and even more; and seasoned stocks which have long record of solid earnings.

In this way your savings eventually will earn you an average of 6%—and that is enough to try for in most cases.

"Can't Spare the Money!"

"But I need all my capital in my growing business," says the business man. "It keeps me scratching to meet my daily needs."

That is precisely why YOU need this plan more than some others. The man who skates on thin ice needs to have a life-line handy. When operating on a narrow margin, one most needs a little surplus on which to draw in case of real necessity.

So this Business Insurance is VITAL to you — that is just why it is called Business Insurance.

For the money is not lost. It is your business to think of it as put away where you cannot get it. But as a fact, the money is there in the bank or invested in securities so sound that they can be hypothecated without a moment's notice in any bank.

If real, pressing need hits you—if ill-

(Continued on page 29)

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

OF prime importance in the market for plumbing supplies was the advance in range boilers on the thirty-five and forty-gallon sizes. Manufacturers have been experiencing much difficulty in getting supplies of raw materials, due to demand for plates for shipbuilding to the exclusion of commodities for the domestic trade. In black sheets there has been a decidedly firmer tone in No. 10 gauge and heavier with advances in price. These sizes are under embargo to the merchant trade as they are also used in shipbuilding.

Galvanized sheets have been arriving in better supply on old contracts and prices were easier in some quarters during the week. There has been an easier tendency in lead products and lead sheets are accordingly lower in price.

Since last issue old materials have shown dullness with lower prices quoted, but a turn is apparent in the market and a better demand has sprung up from the consuming mills and prices in brass, zinc and copper are again firmer.

Boiler tubes have been revised upward. There is an excellent demand for these products at the present time by the Government to be used in shipbuilding. No further stocks are coming forward into Canada as an embargo has been placed on their shipment from the United States. Present stocks may be sufficient to meet the needs of the trade for the balance of the year, but where additional supplies will come from after that time is a problem that is perplexing dealers. Ingot metals are in generally weaker tone with little business being done.

Building operations are confined mostly to completing work that has been under way for some time. With the approach of the winter season there will be fewer new structures undertaken. Trade in plumbing supplies is somewhat quiet, but in valves there is a continued good demand.

TORONTO, Oct. 13. — Manufacturers of plumbing supplies are finding their operations still further restricted through the difficulty in getting raw materials. While lower prices have been named on pig iron and steel commodities in the United States none of this lower priced material is obtainable as yet. The mills are all booked up for the balance of the year on high-priced contracts and orders seeking placement will not be accepted except for some distant date in the future to which the lower-priced quotations do not reach. The effect of this is to eliminate possibility of lower-priced iron and steel until some distant date in the future. Embargoes are becoming more numerous and this helps to increase the difficulties of manufacture. It is now apparent that there will not be much diminution of shell-making for some time as munition plants are turning their energies to the smaller shells rather than to the heavier ones. This will tend to keep steel in demand and prices will at least hold steady for manufactured products as a result.

Range Boilers Go Up $2.50 To $5 Each

RANGE BOILERS.—On the 35-gallon and 40-gallon size range boilers, both standard and extra heavy, increases in price have been made effective and range from $2.50 on the 35-gallon standard to $5 on the 40-gallon standard. Price of the 35-gallon standard is now $17 and for extra heavy $20.50. For the 40-gallon size the price of standard is $20.50 and extra heavy $24. Quotations on the 30-gallon and 52-gallon sizes remain unchanged. Scarcity of raw materials for manufacture, due to the diversion of plates for shipbuilding, has been the reason of the advance. Following are the prices:

	Standard	Extra Heavy
30-gallon range boilers....	$13.00	$17.00
35-gallon	17.00	20.50
40-gallon	20.50	24.00
52-gallon	28.00	32.00

Pipe Materials Still Difficult To Obtain

WROUGHT PIPE.—Deliveries of raw materials for the manufacture of wrought pipe are greatly restricted owing to the operation of the licensing system and manufacturers must of necessity curtail their operations. Demand for pipe is not heavy. Mills can give no assurance as to when they will be able to make better deliveries on raw materials.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917.

Standard Buttweld.

	Black	Galvanized
	Per 100 feet.	
⅛ in.	$ 5 00	$ 6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld.		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES.

4" and under, 45%.
4" and under, running thread, 25%.
4½" and larger, 40%.

STANDARD COUPLINGS.

4" and under, 35%.
4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces.

Country Building Trade Is Falling Off

ENAMELWARE.—With the approach of the winter season it is only in rare cases that new buildings are being undertaken. In the cities where foundations have been laid, work may continue well into the winter. At any rate there is a noticeable diminution in demand for plumbing goods from the country districts. Demand generally is only fair and prices remained unchanged.

Bath-tubs, roll rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bath-tubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple.....	16 80
Closets, oak tank and seat	22 00
Do., enamel iron or white vitro tank...	23 75

Range On Fittings, Elbows, Tees, Narrowed

SOIL PIPE FITTINGS.—Where the

discounts on cast iron fittings, elbows, tees, etc., were recently from 10 to 15 per cent. off list the higher quotation has disappeared and quotations are now quite generally made at 15 per cent. off list. This does not indicate an easier tendency in the market but is simply by way of readjustment. Similarly the range on bushings has been narrowed from 20 per cent. to 33 per cent. as formerly given and is now from 30 to 33 per cent. Other lines remained unchanged.

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	....	15%
Cast elbows, tees, etc.	....	15%
Plugs	....	30%
Bushings	30%	33%
Flange unions, standard	....	20%
Dart unions, ¼-inch to 2-inch	20%	25%
Do., 4½ in. and larger	....	15%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4-in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.	0 50	0 63
Do., Class B, lb. net	0 22	0 33
Do., Class C, lb. net	0 15	0 22

Valves Are Still In Heavy Demand

VALVES.—There is still an excellent demand for valves, manufacturers being quite gratified over the way this business continues to flourish. Prices held in steady position at recent quotations as hereunder:

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard.	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	10
Globe, angle and check valves, standard.	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Oakums Advance ½ To 1c Per Pound

OAKUM.—Higher prices have been announced on nearly all grades of oakum. Best American is now quoted at $21.50 per hundred pounds, an advance of ¾ of a cent a pound. U.S. Navy has also advanced ¾ of a cent per pound and is now quoted at $20.75 per hundred pounds. Clipper unspun oakum remains unchanged at the recent quotation of $21.50 per hundred pounds. U.S. Navy English unspun has been advanced 2½c to 20c per pound. U.S. Navy English spun is now quoted at $12 per hundred pounds. Plumbers' spun oakum remains unchanged at quotations of $8.50 to $10 per hundred pounds, although an advance in certain quarters of a ½c was made to basis of $9.50 in bales and $10 in broken lots.

		Per 100 lbs.
Best American	....	$21.50
U.S. Navy unspun	....	20.75
Plumbers' spun	$8.50	10.00

Embargo On Plates And Prices Go Up

SHEETS, PLATES. — Owing to the embargo placed on the shipment of steel plates of No. 10 gauge and heavier by the United States Government an acute situation has developed in the Canadian market. Some dealers have withdrawn quotations on No. 10 gauge black steel sheets entirely. Those who have any stocks have advanced the price 50c per 100 pounds, making the quotation now $12. On 3-16 inch plate an advance of $1 per hundred pounds has been recorded and a similar advance on ¾-inch boiler plate. Former is now quoted at $13.25 and the latter at $13 per hundred pounds. The United States Government has adopted the attitude of conserving the supply of sheets to the end that shipbuilding may be pressed forward with every possible despatch. Mills have been given orders to turn their energies to the production of plates for this purpose to the exclusion of production of other lines of steel. Galvanized sheets were in weaker market during the week, and quotations were reported to have been made as low as $11 on the 10¾-oz. size. For the most part quotations ranged from $11.25 per 100 pounds to $11.80, and in some instances the high quotation of previous weeks at $12 was maintained. Fairly good stocks of galvanized sheets have been coming forward on old contracts, and this has put a different complexion on the market.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$	$11 50
12 gauge	10 05	11 60
14 gauge	9 95	11 65
16 gauge	10 00	11 75
18-20 gauge	9 80	10 80
22-24 gauge	9 85	10 85
26 gauge	9 90	10 90
28 gauge	10 00	11 00
29 gauge	10 10	....
3-inch inch plate	.....	12 25
¼-inch boiler plate	....	12 00
GALVANIZED SHEETS—		
10¾ oz.	11 25	12 00
U.S. 28	10 95	11 70
U.S. 26	10 65	11 40
22 and 24	10 50	11 25
18 and 20	10 35	11 10
16	10 20	10 95
14	10 10	10 85

Readjustment In Boiler Tube Prices

BOILER TUBES.—A slight readjustment has been made in the price of boiler tubes following the announcement recently of a 10 per cent. increase in price. Supplies of boiler tubes are getting depleted, with small prospect of getting additional supplies from the United States. Dealers locally assert there may be sufficient stocks to last the Canadian trade for the balance of the year if there is not an extra heavy demand. Following are the prices prevailing:

1-inch	$33 00	$ ....
1¼-inch	36 00	....
1½-inch	38 00	33 00
1¾-inch	38 00	32 00
2-inch	45 00	33 00
2¼-inch	48 00	35 00
2½-inch	50 00	38 00
3-inch	58 00	45 00
3¼-inch	....	51 00
4-inch	82 00	67 00
3½-inch	70 00	55 00

Lead Wool And Lead Sheets Decline

LEAD AND ZINC PRODUCTS. — There was a decidedly weaker tendency in lead products during the week following a similar condition in the primary market. Lead wool was quoted down at 15¼c to 17c, lead sheets for 3 and 3½ pounds to square foot were down 2¼c at 15½c to 16¼c, while lead sheets from 4 to 8 pounds were quoted at 14¾c to 15½c, a decline of 2¾c per pound. Solder remained unchanged at recent quotations. Demand for lead and zinc products is reported fair.

Lead pipe, lb.	$ 0 17	....
Lead waste pipe, lb.	0 18	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 15¼	0 17
Lead, caulking, lb.	0 13½	....
Lead sheets, 3 lbs. sq. ft.	0 15½	0 16¼
Lead sheets, 3½ lbs. sq. ft.	0 15½	0 16¼
Lead sheets, 4 to 6 lbs. sq. ft.	0 14¾	0 15½
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 40	....
Solder, strictly, lb.	0 37½	0 38¾
Solder, commercial, lb.	0 36	0 38½
Solder, wiping, lb.	0 34	0 34¾
Solder, wire, lb.	....	0 41
Zinch sheets, per lb.	0 26	....

Conductor Pipe And Eavetrough In Demand

EAVETROUGH, CONDUCTOR PIPE. —The market for corrugated sheets, conductor pipe and eavetrough is still in a waiting condition, pending more specific information as to prices fixed in the United States. Corrugated sheets are in light demand, but conductor pipe and eavetrough are reported in fairly good demand. Conductor pipe and eavetrough are quoted at 10 per cent. off list.

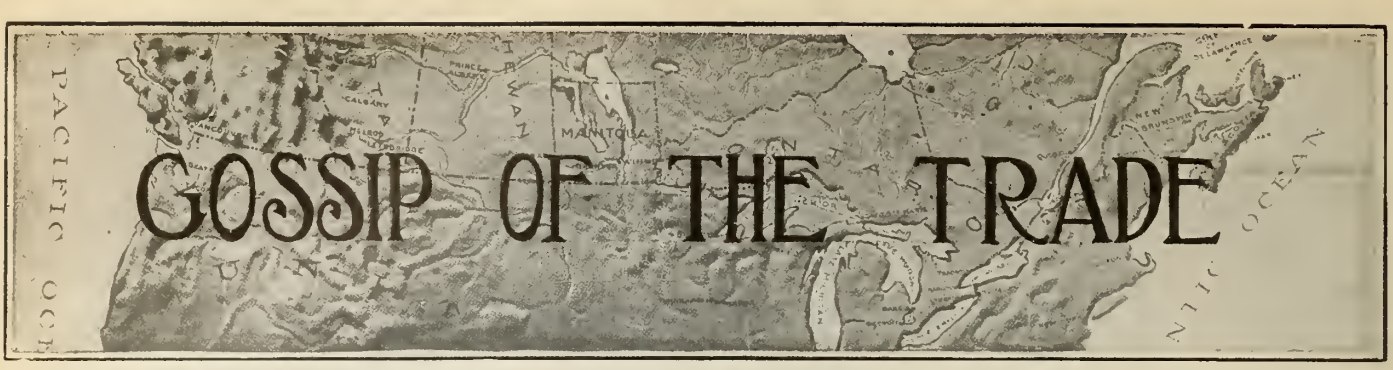
	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7.20
No. 26 gauge	9.60-10.00	....

Lead And Spelter Show Easier Tone

INGOT METALS. — There was a weaker tone in lead and spelter during the week in the primary market and the local market was down for spelter as a result of this situation. Other ingot metals remained unchanged in price at quotations of last week. There is a good demand for copper reported but dealers are unable to get sufficient supplies.

COPPER.—A good demand for ingot copper was reported during the week,

(Continued on page 32)



TECHNICAL SCHOOL CLASSES START

The winter classes at the Toronto Central Technical School have made a start. The enrolments make a very good showing, at least in the plumbing and heating classes. Twenty-four names have been sent in, which, under present circumstances, is a very creditable number. As time goes on no doubt more will enrol, and a splendid showing is expected.

Mr. John Fullerton is in fine trim for a hard winter's work, so we can look forward to big things from this department of the Toronto Central "Tech."

MOVED TO KINCAID, SASK.

Mr. George McCormack has left Estevan and gone to Kincaid, Sask., where he will take up residence. Mr. McCormack has been a resident of Estevan for the past two years, being the proprietor and manager of the Estevan Heating and Plumbing Co. With the advent of quiet times, and absence of activity in the building trade, Mr. McCormack will find fresh fields of work in Kincaid and district, where his friends and patrons in Estevan wish him every success.

STORK PAID A VISIT

Though we are somewhat late in reporting the fact we feel sure that the friends of G. F. Frankland, the worthy secretary of the Ontario society of domestic sanitary and heating engineers, will be pleased to know that he is the proud daddy of a son at last. Mrs. Frankland and son are in the best of health and little "Winona" the only daughter is "over the moon" at having a little baby brother.

The sanitary engineers along with every personal acquaintance of his worship, beg to tender their best wishes for the Frankland family, may the new addition contribute to the happiness of all concerned.

TRADE GOSSIP

Quebec, Que.—Patrick Dobbin, plumber, is dead.

Mimico, Ont.—Town Council will have sanitary sewers constructed.

St. Mary's, Ont.—Water Commission will purchase a waterworks pump.

London, Ont.—City Council contemplate construction of storm sewers.

Gardston, Alta.—Town Council contemplate improvements to waterworks system.

Sydney, N.S.—City Council contemplate construction of water main and sewer on Newbury St.

St. John, N.B.—Wm. Murdoch, C.E., City Engineer of St. John, died suddenly on Monday the 8th inst.

Guelph, Ont.—City Council contemplates construction of sewers from Edinburgh Rd. to Meadowview Ave.

Hamilton, Ont.—Sewer will be constructed on Dunsmore Rd. from Ottawa St. to London St. for the City Council.

Prince Rupert, B.C. — Preliminary readings of by-law to raise $10,000 for the extension of the water mains at Seal Cove took place recently.

Chapleau Township, Ont.—Township Council will build an addition to its pumping station and instal an electrically-operated pumping unit to cost $6,000.

Sarnia, Ont.—City Council contemplates erection of disposal plant. Town Council contemplate construction of sewer on Capel St. from Maxwell to Nelson Sts.

Renfrew, Ont.—Waterworks Department contemplate construction of sewer on Opeongo St. Three hundred feet of six-inch vitrified sewer pipe will be purchased for the purpose.

CONTRACTS AWARDED

Georgetown, Ont.—A. J. Anthony has plumbing and heating contract for $10,000 alterations to Bank of Hamilton.

Trail, B.C.—V. Bianco has contract for 1,950 feet of vitrified pipe line, also five miles of steel mains throughout the municipality.

Montreal, Que.—L. E. Moulton & Co., 142 Inspector St., have plumbing and heating contract for $50,000 addition to factory for C. H. Catelli Co., Ltd.

St. Hyacinthe, Que. — A. Blandin & Co., 115 Cascades St., have plumbing and heating contract for $25,000 telephone office building for Bell Telephone Co.

Montreal, Que.—T. Latourelle & Fils Ltee., 6 Craig St. W., have plumbing, roofing and heating contract for $115,000 school for the Roman Catholic School Commissioners.

NEW BOOKLET

The American Steel Export Company has issued a new twenty-four page pamphlet giving the groups of countries and lists of materials affected by the President's proclamation and subsequent orders together with facsimiles of forms prescribed and an explanation of their use.

HOT WATER SUPPLY

No argument will controvert the fact that water is the most essential requirement in a home or building occupied by mankind, and where water is necessary hot water is doubly a necessity.

Realizing this, no effort has been spared by manufacturers of all manner of appliances to provide the public with means whereby an ample supply of hot water can be procured.

How is hot water required? It is required at a moment's notice just as cold water is. The question, then, resolves itself into having every home furnished with some means that will guarantee hot water on tap 24 hours a day.

One of the latest booklets published which shows how this can be done is being issued by the Pittsburg Water Heater Company, 124 Richmond St. W., and 12 Queen St. E., Toronto.

It is a book worth while and should be in possession of every reader of SANITARY ENGINEER. A postal will procure it.

CARELESSNESS CAUSES FIRE

Another case where a plumber is the cause of a fire and other damages by water, etc., which might have been much more disastrous, occurred in the basement of the Northern Electric Building, Sackville Street, Halifax, recently. The report reads as follows:

"The fire was started by a plumber, who was mending a leak in the basement pipe. The torch, which he was using to light his way, come in too close contact with cotton sacking, covering some of the hardware. He tried to put the flame out without calling the Fire Department, thus permitting the fire to get a little headway. When the blaze was discovered by the employees, an alarm was rung and the fire soon put out.

"Mr. Murdock, the general manager, said that the actual damage could not be immediately determined, as the cellar was impossible to enter, for smoke. He said the goods contained were chiefly hardware and pole lines, also batteries. The fact that nothing stored there was

inflammable saved the situation. The sacking is slow burning and caused more smoke than fire. The water, it is feared, has caused considerable damage to the materials."

It seems too bad that, in these days of enlightenment, such things as this should happen, particularly when no plumber's kit is complete without a small flashlight. Every year we have reports such as the above come to our notice, and all for the want of a small portable flashlight, one of the most useful things any journeyman could possibly have in his kit.

GET GASOLINE FROM GAS

The extraction of gasoline from natural gas by compression and condensation has been an important and rapidly growing industry in recent years. In 1915 about 65,000,000 gallons were produced by such methods, while in 1916 the estimated production was 100,000,000 gallons. This gasoline is of double importance in that it can be blended with naphthas otherwise unsatisfactory for use in the automobile, and made into an acceptable motor spirit.

The new absorption process is different from the older compression process and heretofore has not been described in literature. It is a method only recently commercially applied to natural gas yielding the same quality of gasoline and capable of being applied under conditions where the older process could not be employed profitably. By it the gasoline in natural gas, though extremely lean, can be absorbed in oil from which it is separated by distillation. Natural gases yielding less than 1 pint of gasoline from each thousand cubic feet of the gas have been treated with commercial success, where formerly this gasoline had gone to waste and had constituted a source of much trouble and expense in the pipe lines.—U. S. Official Bulletin.

SEEKING REMEDY FOR POLLUTION OF INTERNATIONAL WATERS

The pollution of international waterways and the remedy, a question which has been standing for years, was considered by the International Joint Commission, which met at Ottawa recently. The Canadian section is composed of Messrs. C. B. Magrath, H. A. Powell and P. E. Mignault, and the United States section, of Senator Gardner of Maine, Hon. James A. Tanney, of Minnesota, and ex-Governor Glenn, of North Carolina.

Investigations on the subject in the past six years have been under two main heads—to ascertain the service of pollution, and to determine what remedy should be applied. It is along the Niagara and Detroit Rivers that the main pollution from sewage occurs, the principal offenders being the cities of Detroit and Buffalo and Canadian cities, such as Niagara Falls, Windsor and Sarnia are affected.

Proposed Treatment

Engineers who made exhaustive investigations into the case came to the conclusion that a certain standard of treatment is necessary, the plan generally favored being the construction of sedimentation basis. Experiments at Milwaukee in the treatment of sewage by aeration have also worked well.

The Commission, acting on these reports, will likely draw up a final recommendation along the line above indicated. The report will go to the Canadian and United States Governments, which will have to do with the enforcement of the remedial measures necessary to the protection of public health. Ontario is vitally interested in the question, and F. A. Dallyn, engineer of the Provincial Board of Health, was present to attend the meeting of the Commission.

Referring to the above, it should be stated that any recommendation put forth to prevent pollution of our Canadian as well as international waters should be looked upon as progressive.

But what must we think of our own Canadian Government? Some years ago Ottawa was visited with two typhoid epidemics. Members of Parliament from all over Canada were disgusted to learn that Ottawa dumped her raw sewage into the Ottawa River. But a new Parliament Building is going up, and the raw sewage is to be allowed to flow direct into the river. Where are our "experts," professors, etc.? Is there not one that could voice his opinion, and at least recommend some form of purification of the sewage flowing from the Parliament Buildings?

All we can say is that "example is better than precept," and if the Dominion Government desire to have the Canadian people in other towns refrain from breaking the laws of the country, they certainly should show a good example. But we had better wait and save that 10 per cent. commission, which the contracting company would get if any purification plant is included in the new structure.

LARGE VENTILATING CONTRACT

Sheldons Ltd. of Galt, Ont., have secured the largest contract for ventilating equipment ever awarded in Canada. The equipment is for the New Union Station now approaching completion at Toronto, and will consist of 26 Keith multivane fans driven by Canadian Westinghouse motors. Twelve of these will be supply fans delivering a total volume of 270,000 cu. ft. of air per minute and fourteen will be exhaust fans having a total capacity of 210,000 cu. ft. per minute. The contract includes air washing, cooling and humidifying equipment consisting of eleven air washers of the Sheldon Spray type and 174,000 sq. feet of vento-radiating surface used in the form of tempering and reheating coils. The contract price is $63,000. Wells & Newton of New York and Toronto are the contractors for the plumbing, heating and ventilating. Walter A. Armstrong is the consulting engineer and Ross & MacDonald are the architects.

TORONTO SOCIETY OCTOBER MEETING

The Toronto Society of Domestic Sanitary and Heating Engineers will hold their regular monthly meeting for October on Wednesday evening, the seventeenth, at 8 p.m. sharp, in the Canadian Foresters' Hall, 22 College Street.

Your attendance on this occasion is respectfully requested by the officers who have arranged a most interesting programme for the meeting.

Commencing with this meeting a series of talks on overhead expenses and profits as relative to the plumbing and heating business has been arranged for; these talks will open the meetings and will only be of half hour duration. This series will prove most enlightening and of an educational nature to us all, so remember the hour of opening and fail not to be there on time.

The address of the evening will be given by Edwin Newsome, Editor of SANITARY ENGINEER, on Cast Iron vs. Wrought Iron Pipe, as used in Plumbing Construction.

Lest we forget to remember those of us who are over yonder, note below:

Corporal Harry Griffiths, (No. 317049) 13th Battery, C.F.A., Canadian Expeditionary Force, Army Post Office, France.

Dates of Meetings

Keep the following dates in mind, and make it your business to attend:

North Enders.—1st Thursday of each month, at 8 p.m.

West Enders.—2nd Thursday of each month, at 8 p.m.

East Enders.—4th Thursday of each month, at 8 p.m.

Regular monthly meetings.—3rd Wednesday of each month, at 8 p.m.

Executive committee meetings.—2nd and 4th Thursdays of each month, at 3 p.m.

NOW TIME TO STUDY BUSINESS INSURANCE

(Continued from page 25)

ness or misfortune visits you—take your securities to the bank and borrow against them. Then work like a beaver to get them free again!

Compare, if you like, that kind of assets with a quantity of stock for example, bought far in advance of need. You can dispose of that stock—how. By taking a heavy loss. But the bonds—why you do not need even to dispose of them!

All times are the right times to begin this system. But right now is the RIGHTEST time that has come for many a long year. For these are days of liberal profits. See that you conserve a lot of yours in Business Insurance. **And if you start, you will be safe—you will never be without Business Insurance again.**



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

TROUBLE WITH RAM

Editor SANITARY ENGINEER:—

I am having trouble with a ram, it will work about 10 minutes, then give two or three little raps at the valve then stay closed, on looking down 3 inch stand pipe, the water runs clear out of it at times and only half fills the drive pipe, while the ram is wasting, but as soon as the ram valve closes, the water will overflow over the top of stand pipe, and when the ram stays closed it half fills the stand pipe, would you send reply by return and oblige.—S. P. S.

In this case the reply has been mailed, but for the benefit of our readers we will show what the trouble is.

In the first place the standpipe is not large enough. This is proved by the fact that the water is soon exhausted. secondly, the stand pipe is too far away from the ram it would be better if it were about 100 feet away at most, but as there is one stand pipe in, the job could be improved if another stand pipe 4 inches in diameter and about 100 feet away from ram with lots of height, say 2 feet above the high water level.

As our correspondent has not furnished us with information as to how much higher the water is at its source than at the ram, the above information is the best we can give him.

We presume that there is an ample supply of water at the stream and that there is no air in the drive pipe between the stand pipe and the source of supply.

In our next issue we will publish an article on the installation of the hydraulic ram, along with tables showing what sizes of pipes etc. are necessary.

Editor.

MAIN HOUSE TRAP AND BREATHER PROBLEM

(Continued from page 17)

The cause of such freezing is plainly an over supply of cold air, thus reducing the temperature within the sewer to the freezing point. Therefore, ventilation of a sewer should be adjusted to its requirements and this can best be done by paying some little attention to the air admission openings on a M.H. cover. I have seen covers or "gratings" where the area of the air spaces was as high as thirty-two per cent. of the cover area. The area of the air space in this cover, as illustrated, is about two per cent. of the whole. This can easily be varied to suit requirements by varying the number and size of the holes, or even by plugging certain of them. Assuming the omission of the house trap there is a relationship between the air spaces in the cover and the temperature of the sewer which will result in proper ventilation of the latter. The greater the range of temperature in any locality the more difficult it is to maintain uniform ventilation in its sewers. From the results of using this cover it seems to be satisfactory over a large range of temperature.

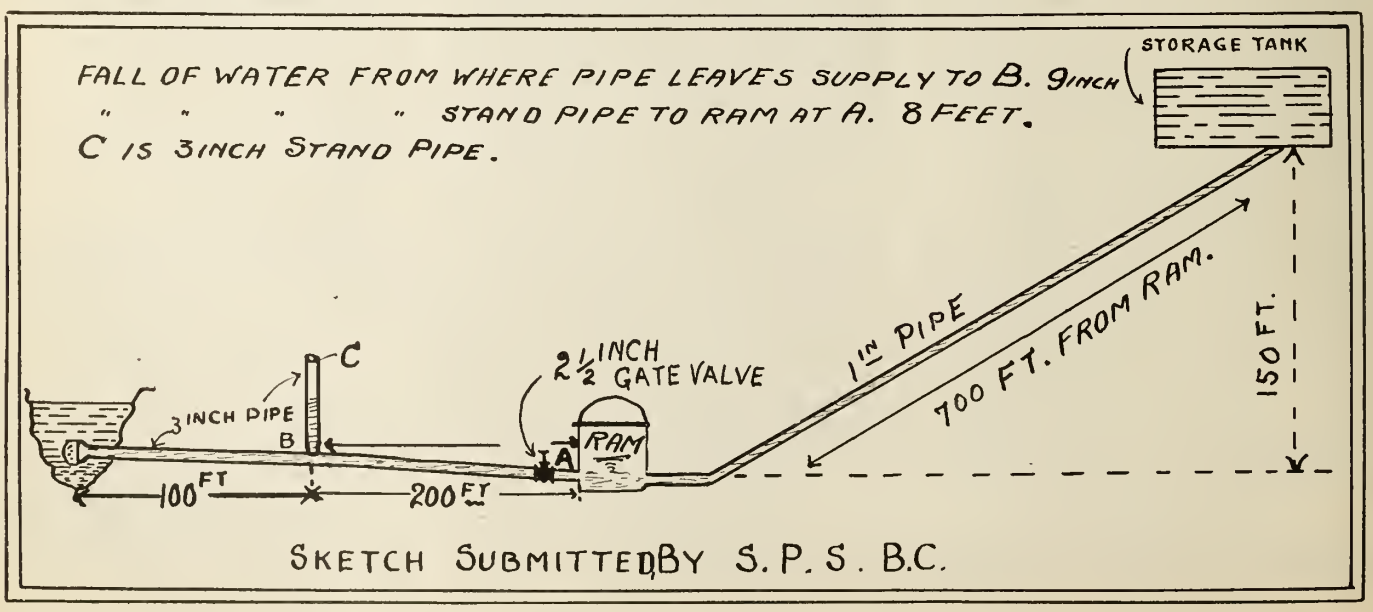
Should you see fit to make use of this illustration or any part of these notes in the SANITARY ENGINEER, I shall be pleased to receive a copy.

Yours truly,

W. M. SCOTT,

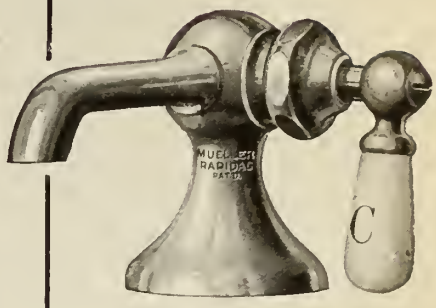
Consulting Hydraulic & Sanitary Engineer, Winnipeg, Man.

A monthly mechanical paper is not what one would call a newspaper, yet there is lots of news in the "ad" pages.



SKETCH SUBMITTED BY S. P. S. B.C.

"There, I'm proud of that job"



If when you finish each installation of plumbing fixtures you want to feel perfectly satisfied; if you want to feel that each job is a standing advertisement of your business ability and workmanship; if you want to be able to say: "I'm proud of that job," attach only

MUELLER
Rapidac
BRASS GOODS

Mueller Goods will improve any class of fixtures. They add that touch of grace and refinement that marks the difference between an ordinary and a high-class job. They raise the standard of your work, and help to put you in the "top-notch" class.

Mueller Goods give added value in appearance and service to every fixture. Their beauty of design and the fact that they are fully warranted will generally convince your customer that Mueller Goods are the most economical.

Sold by jobbers throughout the Dominion.

H. Mueller Mfg. Co., Limited
Makers of High-Grade Water, Plumbing and Gas Brass Goods
SARNIA :: :: ONTARIO

MARKET CONDITIONS AND TENDENCIES

(Continued from page 27)

but dealers state they have difficulty in getting supplies due to the inability to place contracts at the established price by the United States Government. Casting copper continues to be quoted at 31½c and electrolytic at 32½c per pound.

TIN.—There was a steadiness in the market for tin locally during the week and prices were unchanged at 63½c to 65c per pound. Future tin declined in the primary market following lower prices on spot stocks.

SPELTER.—An easier tone characterized the spelter market during the week and prices were quoted at ½c lower at 10c. The market is a waiting one pending action by the United States Government within the next fortnight with respect to purchases.

LEAD.—The market for lead is dull and heavy with intimations in the primary market that the Trust price is likely to be reduced to 7.50c basis. Locally quotations were unchanged at 10½c.

ANTIMONY.—There is a light demand for antimony both locally and in the primary market. There is practically no trading in future antimony at the present time. Locally prices were maintained at 18c pound.

ALUMINUM.—The market is dull at primary points and there is an inclination to an easier feeling. Quotations were unchanged locally at 60c pound.

PIG IRON.—Prices on pig iron are unchanged but are purely nominal so far as the Canadian market is concerned. In the American market most of the business done is on old contracts and makers are withholding quotations for the reason that they are well committed for the balance of the year. Consumers can only await development.

A NEW METHOD OF ESTIMATING RADIATION

(Continued from page 19)

KRw. These correspond to a difference of 60, 70, 80, 90 and 100 deg. between the room and the outdoor temperatures. As it is not common to find ceilings and floors exposed directly outdoors, the values for these have been calculated for a difference in temperature of 30, 40, 50, 60 and 70 deg. It is common practice to assume attics and cellars about 30 deg. higher than the minimum outdoor temperature allowed for. Dirt floors and floors built close to the ground are figured the same as cellars.

The tables give 8 values of KRs and KRw for heating air. These correspond to ½, ¾, 1, 1¼, 1½, 2, 2½ and 3 air changes per hour.

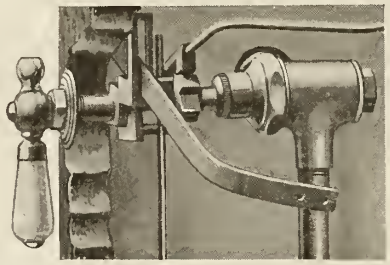
For any other working temperatures than these the values KRs and KRw can very easily be calculated by using the formula. If the temperatures to be figured for are very constant with any one designer it might prove to be equally convenient to calculate similar tables for use at these temperatures. However, it will not require much time to calculate the factors separately with the formula for each job.

A facsimile of the special form is shown in the Reference Tables which, as mentioned before, is a very essential feature of this system. It is most convenient when made up on sheets 8½ by 11 in., which is beginning to be recognized as the latest standard for all printed matter of this type. The complete data for any one room does not require more than a ½-in. space on the paper. The big advantage of this will readily be appreciated by those who have been in the habit of keeping similar records while using the original method. With these old style records and the original method of calculation it was impossible, if the record was to be at all complete, to record more than 5 or 6 rooms on one sheet. Here it is possible to record 10 and 13 rooms on a single sheet, the heading being necessary on the first sheet for each floor only.

The continuous use of this system and this or a similar type of form will greatly facilitate the work of calculation and save hours of time for the busy engineer or contractor.

Mrs. Casey—"Me sister writes me that every bottle in that box we sent her was broken. Are ye sure yez printed 'This side up, with care on it!'"

Casey—"Oi am. An' for fear they shouldn't see it on the top. Oi printed on the bottom as well."



TRADE SILENTFILL MARK

Water Closet Combinations Without Ballcocks— No Noise

MANUFACTURED BY

CALLOW & PHILLIPS

40-42 Lombard St., Toronto, Can.

Telephone Main 2016

3 BIG REASONS WHY YOU NEED

PURO

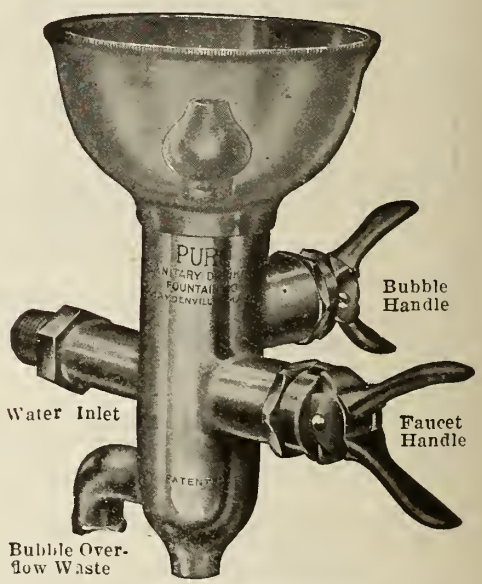
(MADE IN CANADA)

1. Puro Sanitary Drinking Fountains will give you a *better* water supply *cheaper*.
2. Puro will cut your water bills 15% to 35%.
3. PURO will safeguard the health of your employes and raise the standard of efficiency.

Are not these reasons enough? Then why hesitate longer?
PURO equipment is not expensive—the first cost is *low* and the up-keep *nothing*. Easily attached; positively fool-proof. Let us make you a special proposition for a try-out in one of your departments. Write us now—to-day—giving us the number of men; an inquiry will cost you nothing.

"PURO-FY" YOUR WATER SUPPLY

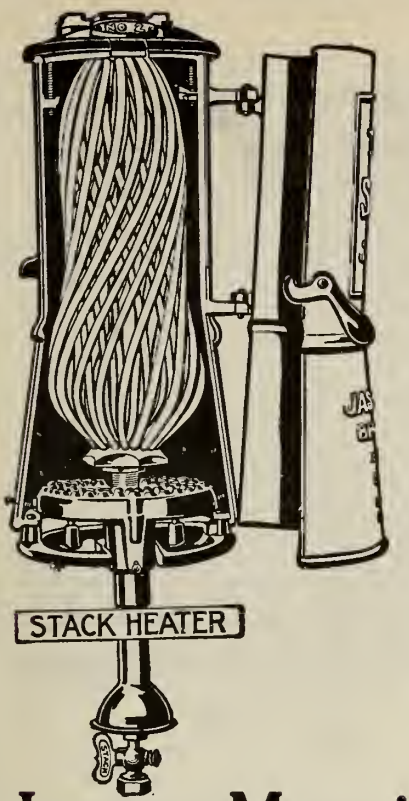
Puro Sanitary Drinking Fountain Company
143 University Ave.
TORONTO, CANADA



SITUATION WANTED

PRACTICAL, EXPERIENCED PLUMBER AND steamfitter wishes position with wholesale plumbing and heating concern, as salesman preferred. References furnished. Apply Box 702, Sanitary Engineer, Toronto.

THE first artesian well to be bored in Europe, of which data are available, is the tube well at Grenelle in France, which was sunk by the French Government between 1834 and 1841 in the hope of obtaining a sufficient supply of water for Paris. The depth is 179 ft., at which level a prolific supply of water was reached, giving an overflow at the surface of 600 gallons per minute. In Upper Silesia there is a bore-hole 6,572 ft. deep.



STACK FACTS

From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

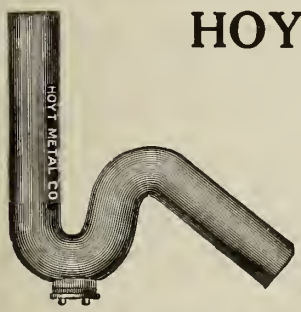
The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited

93-97 Adelaide Street West, TORONTO



HOYT METAL GOODS ARE KNOWN

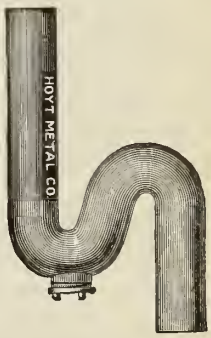
FROM COAST TO COAST



As time-savers there are none equal to our Wiping Solder Bar or Wire Solder.

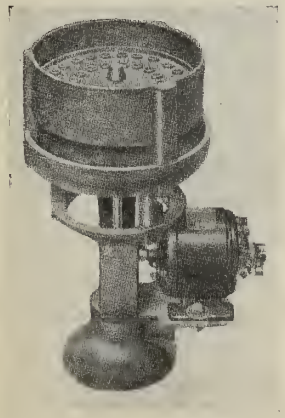
Hoyt Lead Traps, bends and waste pipe are in a class by themselves.

Our Mixed Metal Sales Amount To Over $5,000,000 Annually.



Write your Jobber **HOYT METAL COMPANY, TORONTO, ONTARIO** ***Write Us***

New York, N. Y., London, Eng., St. Louis, Mo.



NEW DIFFERENT BETTER

The cost of coal is a serious problem to-day. Your customers have all tried to solve it and failed. We have tried and succeeded.

ROTARY OIL BURNER

is the result of our labors. It burns fuel, oil, or kerosene. Can be installed by any plumber. Works in connection with present heater. Installed in the fire-box, gives a terrific fire in a few seconds. Can be turned off instantly when not needed. No trouble to take care of. Big profits for the plumber and an unlimited field.

NATIONAL ROTARY OIL BURNER COMPANY

235 Congress Street, BOSTON, MASS.

PROGRESSIVE REPRESENTATIVES WANTED EVERYWHERE.



Occasionally advertisements are inserted in the paper after this page has gone to press. The insertion of the Advertiser's name on this page is not part of the advertising order, but is inserted solely for the convenience of the reader of the paper

Air Line Systems.
C. A. Dunham Co., Ltd., Toronto.

Air Valves.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Asbestos Goods.
James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Joseph Breeden & Co., Ltd., Birmingham, England.
Canadian Brass Co., Ltd., Galt, Ont.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Limited, Galt.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.
L. Wolff Manufacturing Co., Chicago.

Brass Pipe and Tube.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Cellar Drainers.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Closets.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., Ont.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
L. Wolff Manufacturing Co., Chicago.

Country Residence Equipments.
Darling Bros., Montreal.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Damper Regulators.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Ejectors, Steam.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

Enamelware.
Amherst Foundry Co., Ltd., Amherst, N.S.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
L. Wolff Manufacturing Co., Chicago.

Electric Pumping Machinery.
Empire Mfg. Co., Ltd., London, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Fittings.
Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Flushometers.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
L. Wolff Manufacturing Co., Chicago.

Floor and Ceiling Plates.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Gasoline Engines.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Gas Water Heaters.
Galt Brass Co., Ltd., Galt.
Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Pittsburg Water Heater Co., Toronto.
Rolf Heater Co., Columbus, Ohio.

Generators.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Heaters.
Lord & Burnham Co., Toronto.
Steel & Radiation, Ltd., Toronto.

Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Mixing Valves.
Canada Metal Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
Speakman Supply & Pipe Co., Wilmington, Del.

Monkey Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Oil Burners
National Rotary Oil Burner Co., Boston, Mass.

Packing.
Canadian Wolverine Co., Ltd., Chatham.

Packless Radiator Valves.
Kerr Engine Works, Walkerville.

Pipe and Radiator Hangers.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.

Pipe, Black and Galvanized.
Canadian Tube & Iron Co., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Pipe Cutters.
Trimont Mfg. Co., Roxbury, Mass.

Pipe Joint Compounds.
Canadian Wolverine Co., Ltd., Chatham.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Pipe, Soil, and Fittings.
Anthes Foundry Co., Toronto and Winnipeg.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Toronto Hardware Mfg. Co., Toronto.

Pipe Threading Tools and Machinery.
Borden Canadian Co., Toronto.
John Hall & Sons, Ltd., Brantford.
A. B. Jardine & Co., Hespeler.

Pipe Wrenches.
Borden Canadian Co., Toronto.
Trimont Mfg. Co., Roxbury, Mass.

Porcelain Ware.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
L. Wolff Manufacturing Co., Chicago.

Pumps.
C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Radiator Foot Rests.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,

Radiator Traps (Steam).
C. A. Dunham Co., Ltd., Toronto.
Peacock Brothers, Montreal.

Range Boilers
Toronto Hardware Mfg. Co., Toronto.

Reducing Pressure Valves.
Darling Bros., Montreal.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Roof Flanges and Flashings.
Canada Metal Co., Toronto.
Simplex Sales Co., Chicago.

Rubber Goods
Canadian Consolidated Rubber Co., Ltd., Montreal.

Septic Tank Valves and Syphons.
Anthes Foundry Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Solder.
Canada Metal Co., Ltd., Toronto.
Hoyt Metal Co., Toronto.

Steam Specialties.
Dart Union Co., Ltd., Toronto.
C. A. Dunham Co., Ltd., Toronto.
Kerr Engine Co., Walkerville, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Peacock Brothers, Montreal.

Steam Traps.
Geo. W. Cole Co., Ltd., Toronto.
Canadian Morehead Co., Ltd., Woodstock.
Darling Bros., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Smoke Test Machines.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Tanks, Steel and Wood.
Canadian Machinery Co., Ltd., West Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Testing Plugs.
James Morrison Brass Mfg. Co., Ltd., Toronto.

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Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Trimont Mfg. Co., Roxbury, Mass.
Williams, J. H., & Co., Brooklyn, N.Y.

Unions.
Canada Metal Co., Ltd., Toronto.
Dart Union Co., Ltd., Toronto.

Vapor Heating Systems.
C. A. Dunham Co., Ltd., Toronto.
Moline Heat, Moline, Ill.

Vent Caps
Malcolm Co., Toronto.

Vitro Tanks.
Cluff Mfg. Co., Ltd., Toronto.

Vacuum Systems of Heating.
C. A. Dunham Co., Ltd., Toronto.

Water Supply Systems.
Empire Mfg. Co., Ltd., London, Ont.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto.



154 *Wolff Factory Enameled Lavatories as installed in the Joseph Ryerson Plant, Chicago.*

Quality of Materials and the Workmanship

establish the value of plumbing. If faulty in either particular there is financial loss to the building owner, and reputation loss to architect, contractor and plumber. For over 60 years Wolff Plumbing has been representative of highest quality and perfect workmanship. Its installation is an assurance of complete satisfaction. Why take chances with any other kind?

L. Wolff Manufacturing Company

Manufacturers of Plumbing Goods Exclusively

GENERAL OFFICES
601 W. Lake St.

CHICAGO

SHOWROOMS
111 N. Dearborn St.

Man-Size Conversation

Something about Jones---The Test Question that Silenced Jennings---Where Jones gets the information that makes him listened to when he speaks.

AFTER the little group had finished their cigars, and were about to separate, each going his own way, Brown said to Smith: "Wasn't Jones great? And didn't he put it all over Know-It-All Jennings?"

It was just such a group of men as you see gathered every day round a luncheon table, or in the club lounge; and the theme of the conversation was likewise common enough—the present business situation, and the probable situation when Peace is made.

At first every man had opinions to declare, but most of all Jennings. Jones was, at the beginning, the silent one. But at a point when Jennings, with his usual cocksureness, was voicing some extravagant views, Jones rather jolted him by asking him, "What is your authority?" And Jennings didn't have authority—nothing more than opinions.

It was then that Jones began to talk, and his tactful, well-informed views and statements instantly commanded the attention of every man round the table; for every man was learning. Even Jennings had the grace of keep quiet, for he knew he was listening to a better-informed man.

Jones has a staggering question to put to men with opinions which they express boldly and confidently. It is: "What is your authority? Your opinions are no better than your information." The average man expressing opinions doesn't possess much solid information; he just "feels" that way.

Every man not an idler is interested in Business—first, in his own business; second, in the Nation's business. Whether he be a retailer in a country town; or a manufacturer; or a lawyer advising clients on investments; or a bond-dealer needing to know much about the many factors that affect prices; or a banker; or a private investor whose funds, invested or waiting investments, are his main source of income; he is interested in Business, and he needs information—the real stuff which is the basis of opinion.

Where can each get the kind and amount of information desired?

Let him get it where Jones gets much of his information —from THE FINANCIAL POST OF CANADA.

Jones does a good deal more than just pay $3 to get this paper every Saturday; he *reads* it. To him the POST is the newspaper prized most of all. He sets aside a certain set time each week for reading it. It satisfies him because its views are based on information, and information is the POST'S chief material.

The POST keeps Jones soundly and broadly informed about the business affairs of the country. He finds that the POST takes a business-like view of all questions; that it is not influenced by any political factions or "interests," that it tells the truth whether the readers like it or not. He knows that little of importance will occur in connection with the business of the country without enlightening information or comment appearing in the POST.

He gets the best-informed news about listed and other securities, in the POST:—Milling, Transportation, Pulp and Paper, Iron and Steel, Electrical Enterprises; and so on. This weekly Security News he finds is of an authoritative character —usually signed—prepared by specialists, who, from the nature of their daily work, are in intimate touch with the factors that affect prices, and with high-up or well-informed men who have *knowledge*.

Jones finds no other paper in Canada attempting to give the service the POST does in relation to listed securities.

Jones finds the POST'S editorial page stimulating. He enjoys the biographical stories of Big Men which appear in the POST. The article each week by Agnes Laut gives him information gathered by one of the best informed and highest paid writers in America. In short, for Jones the POST is a treasury of information about Business; and it is Business by which Jones earns his bread and butter and something more.

When Jones mingles with his fellow men, and Business is the Theme of Conversation, most men are willing to listen to him, because his opinions are based on sound and reliable information.

Now, what is the application of all this? It is that you, the reader of this advertisement, may also make yourself a well-informed man about *Business—by reading THE FINANCIAL POST.* The $3 it costs per year is neither here nor there to the man who really wants to *know*—to have knowledge about matters and markets pertaining to his own business; and about the Country's business.

If you want your opinions to be well-informed; if you want a wide knowledge of Business; let the POST go to your home each Saturday. Sign the coupon below. Send no money now. Have the bill go forward in the usual way.

The Financial Post OF CANADA

The MacLean Publishing Co., Ltd.,
143-153 University Ave., Toronto.

Send me *The Financial Post,* for which I will pay $3.00 per year on receipt of invoice.

Name..... Address.....

OVER 50,000 COPIES PER MONTH



Canadians

should be thankful that our Country has a Canadian Magazine fit to take its place in the company of the big American magazines — a magazine equalling in interest and literary merit the big magazines produced in a Country of 100,000,000, where it is possible to obtain $1,000 to $5,000 a page per issue or more for advertising space.

THE making of MACLEAN'S MAGAZINE month by month, year after year, has been hard labor. One difficulty was to get the right sort of matter—Canadian in origin and theme. A few years ago our country possessed few writers and artists of trained and high ability. To-day, thanks very largely to MACLEAN'S MAGAZINE, we have men and women writers and artists producing first-class work; they developed when they found a medium demanding a grade of work equalling the best contributors to American magazines. Also, the Canadian writers and artists who were finding a market for their wares in the United States turned to MACLEAN'S when this magazine showed itself to be a sufficient and creditable vehicle for their work.

The future has a good crop of A1 Canadian writers and artists in store, whose work will appear in MACLEAN'S; but consider these names of Canadian men and women who have already "arrived," and whose work appears in MACLEAN'S MAGAZINE:—

Sir Gilbert Parker,	E. Phillips Oppenheim,
Arthur Stringer,	Peter McArthur,
Arthur E. McFarlane,	L. B. Yates,
Stephen Leacock,	Geo. Eustace Pearson,
Robert W. Service,	W. A. Craick,
Alan Sullivan,	H. F. Gadsby,
Agnes C. Laut,	C. W. Jefferys,
L. M. Montgomery,	J. W. Beatty,
"Janey Canuck,"	Arthur William Brown,
A. C. Allenson,	Lou Skuce.

These are some of the names of Canadian men and women—writers and artists—who are doing work of the highest class, acceptable to the hardest-to-get-into publications of the United States. Ten years ago such a Canadian galaxy had no existence.

BESIDES these professional writers and artists —men and women who depend on their pen and pencil and brush for their livelihood—is a big host of others who write only when successfully urged to do so—because they have something to say that is worth saying. These are usually men in a big way of business, or professional men at the top of the ladder, or men and women doing unusual work of a most important sort—often obscurely because they are not self-trumpeters of their achievements or labors. For example, such men and women as:—

THE LATE SIR MORTIMER CLARK
JOHN BAYNE MACLEAN
ERMAN J. RIDGWAY
LORD NORTHCLIFFE
JOSEPH MARTIN, M.P.
BILLY SUNDAY

All these have contributed under their own name or a nom de plume to MACLEAN'S MAGAZINE in the last 12 or 15 months, recognizing that this magazine can give their messages to the whole nation, and to a class of persons whom they wish to reach.

NOBODY who knows MACLEAN'S would ever call it a story magazine, but rather a national magazine—almost a news magazine. Stories there are in every issue—enough of them to satisfy the right and natural desire for romance, adventure, achievement, business, love and intrigue. But the greater part of the contents of every issue of MACLEAN'S MAGAZINE may be called NEWS—NEWS of men and their work and triumphs; news of the nation's work and workers; news of discoveries; news of movements; news of politics; news of the builders and building of Canada. MACLEAN'S, as Canada's National Magazine, prepared for thinking and intelligent men and women, must be an informative and interpretive magazine, must mirror national opinion, record national affairs and developments, and be the VOICE of prophets, statesmen and leaders. MACLEAN'S is a magazine of to-day—a newspaper of a sort, dealing with big news passed over by daily newspapers whose function is the recording of the day's news—passing news; and who leave the fuller statement —the summed-up presentation of things they can but touch on—to MACLEAN'S MAGAZINE.

A Magazine *of* Power

News features of MACLEAN'S MAGAZINE greatly liked by its 50,000 readers are

The Business Outlook—article.
The Investment Situation—article
The Review of Reviews Department.
The Nation's Business.
Women and their work.

These are regular department features appearing in every issue of MACLEAN'S. They are of the nature of surveys or digests, and perform a service welcomed and praised by all readers who aim to keep themselves broadly informed concerning what's doing in Canada and what's being thought and said and done the wide world over.

REVIEW of Reviews is the outstanding feature of MACLEAN'S, in that it gives the best articles, in condensed form, from the best magazines of the world. A staff of trained people read and study the contents of all magazines and select for each issue of MACLEAN'S twenty or more articles which mirror the world's progress and present the changing aspects of world opinion.

IN rounding out this presentation of Canada's National Magazine a brief reference may be made to one large and discriminating and important class of contributors to it—advertisers. Literally hundreds of them employ MACLEAN'S for their advertising, to reach the influential classes represented by MACLEAN'S list of subscribers, and because they get national publicity economically. These makers and producers of goods of national consumption appreciate the fact that a select circulation of 50,000 gives them, among the most important families of Canada, strong local publicity as well as broad national publicity, and that retail distributors are both canvassed and assisted by their national advertising in MACLEAN'S MAGAZINE. They recognize that $1,000—$3,000 invested in space in MACLEAN'S MAGAZINE to buy 365-day national influence is dirt cheap publicity.

THIS is but condensed presentation of MACLEAN'S MAGAZINE. Very much more can be said about its editorial policy and character, about its making, about its quest for and development of new contributors, about the policy that keeps canvassing methods and advertising columns clean, about the hearty approval of subscribers of MACLEAN'S MAGAZINE, about the significance of 50,000 circulation, about the wisdom of doing a "little advertising in a few magazines" as an initial step in national advertising plans; about the advertising of MACLEAN'S MAGAZINE in all the MacLean Publishing Company's list of business and technical newspapers, about the influence of MACLEAN'S MAGAZINE on distributors.

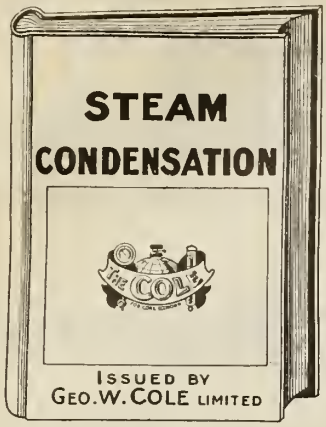
But time and space forbid here and now a continuation of the MACLEAN story.
What is enough to be impressed is—

MACLEAN'S MAGAZINE

Canada's National Magazine

143 University Ave., Toronto

Union Trust Bldg., WINNIPEG Boston New York Chicago London, Eng. Southam Bldg., MONTREAL



This Valuable NEW BOOK is

FREE *"Steam Condensation"*

Every Engineer should send for it without delay. Full of valuable information, and it is

Not a Catalogue

An original practical work. Highly informed Engineers, Superintendents and Factory Managers endorse it. None may read it without learning something of real practical value.

Remember—It's a REAL Gift Book.

Geo. W. Cole, Limited
838 Dundas Street - Toronto

World-Famed Specimens of the Age of Steel

TRIMO



WITH FLAT-LINK OR CABLE CHAIN

TOOLS

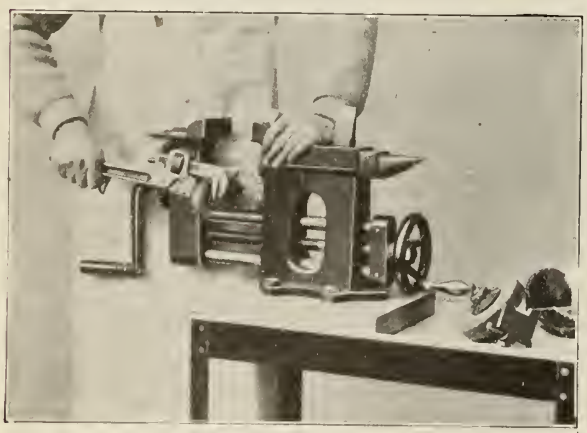
Send for Catalog No. 91

MADE BY

TRIMONT MFG. CO., 55 Amory St., Roxbury, Mass., U.S.A.

Please Mention Sanitary Engineer When Writing Advertisers

THE
Stewart Handy Worker
An Equipment All in One



WEIGHS 90 POUNDS

The Equipment Comprises—

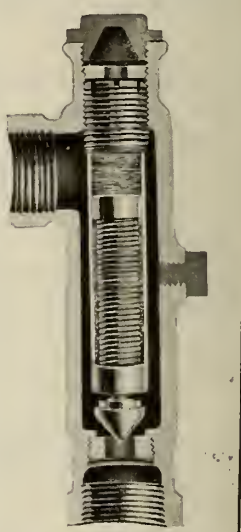
A Pipe Vise
A Bench Vise
A Bench Grinder
A Two-Speed Drill
A Hardy Cutter
An Anvil

It's not a toy. It's a real combination of practical tools for practical people.

Write for full particulars.

CHICAGO FLEXIBLE SHAFT COMPANY
Department H.W. CHICAGO, U. S. A.

Trap Every Steam Line
With a "SARCO"— Radiators Too



The Steam Trap "SARCO" is not like other steam traps, it relies on the expansion of a heavy hydrocarbon oil operating a Sarco spirally corrugated Tube within a renewable cartridge. When steam reaches the cartridge, the trap closes and no steam escapes. When condensation collects the trap opens and discharges it.

The "Sarco" can be used on either steam lines or radiators, for low pressure, vapor or vacuum heating system; is easily installed, automatic in operation.

The "Sarco" is absolutely noiseless, self-cleaning and no moving parts. All parts of the interior are interchangeable and removable. The "Sarco" can be attached to radiators at any angle, and in any position.

Prices low. Write us at once. Can make prompt deliveries.

Peacock Brothers, Montreal
and 220 King Street W., Toronto
BRUCE G. McBURNEY, E.E., *Representative*
Winnipeg, Edmonton, Calgary, Vancouver and Victoria, B.C.

Look at these thin waterways

In the thin waterways of the "King" Boiler the water is heated quickly with a minimum quantity of fuel; the circulation is more rapid and consequently the water in the radiators is always warm.

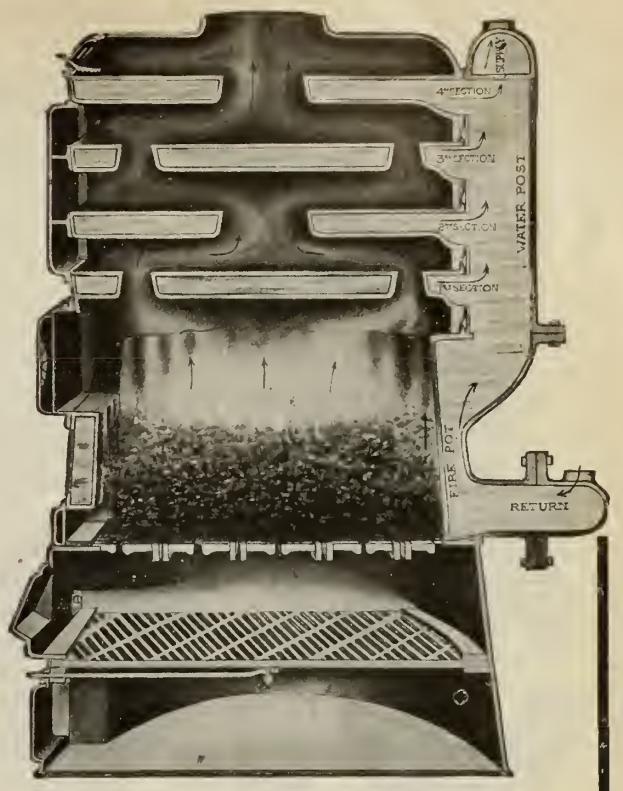
There are numerous other "King" features that make them more efficient and economical such as the wide heatways and the deep fire-pot. These are real heat facts that will impress and convince your customers.

STEEL and RADIATION, Limited

Head Office: FRASER AVENUE, TORONTO

304 University Street, MONTREAL **101 St. John Street, QUEBEC**

AGENCIES IN ALL LEADING CITIES



Sectional View "KING" Boiler

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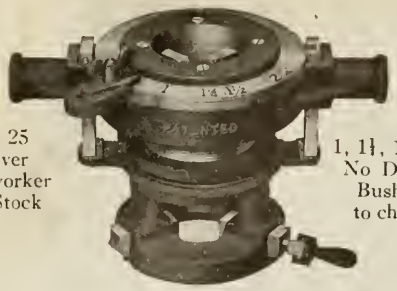
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No. 25 Beaver easy-worker Die Stock

1, 1¼, 1½, & 2 No Dies or Bushings to change

You Don't Pay for "Beavers"—

THEY PAY FOR THEMSELVES

Figure it out for yourself! Thousands of Beavers have been in constant use for nearly 10 years—and are still good.

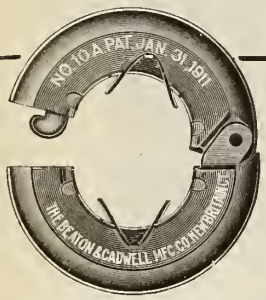
The cost works out at about ½ cent a day for the tool shown in this advertisement.

Call up your jobber now—and order a "Beaver" or at least write for booklet D-12.

MANUFACTURED BY

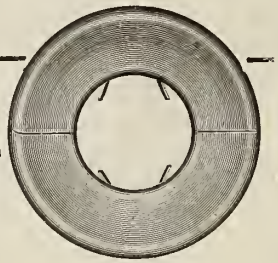
THE BORDEN-CANADIAN COMPANY

TORONTO, CANADA



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

An Extra $5 or $10 Every Week

Quite a bit extra, isn't it? Would you like to have that much coming to you regularly every week, entirely in addition to your weekly pay envelope? Of course you would.

Well now, write us and we will be glad to send you full particulars of our plan—the very same proposition that has proven so successful with hundreds of our representatives. You can read it and apply it right in your own home district. Your spare time is all that's needed. Write us to-day,—next week you'll be earning more money.

The MacLean Publishing Co.,

LIMITED

143-153 University Ave.

TORONTO - CANADA

WINNING THE BUYER'S FAVOR

THE best possible buyer is not made an actual buyer at a single step It is one thing to win the buyer's favor for an article and another to make adjustments incident to closing the sale. Winning the buyer's favor is the work of trade paper advertising. Under ordinary conditions it should not be expected to do more.

This is the sure coupling

DART



A Dart Union will make the coupling sure and certain and give you a job over which you need have no misgivings. "Bronze to Bronze" seats mean no rust, no deterioration—a right job and a tight job every time. Extra heavy iron parts mean no stretching or pulling apart, and the ball-shaped joint means a perfect connection even when pipes are out of alignment.

For your own sake and your customers use a Dart Union every time.

Saves time—makes sure.
Your jobber sells them.

Made in Canada by
DART UNION COMPANY, LIMITED
TORONTO, CANADA

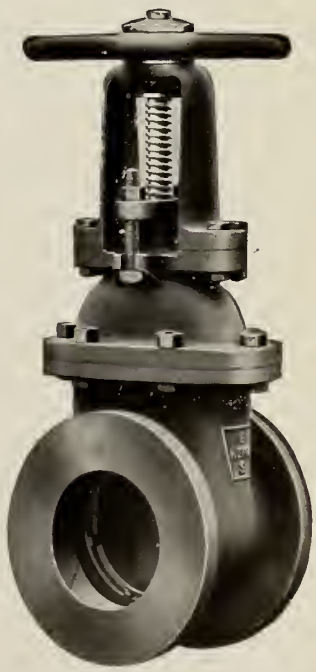
BRONZE
TO
BRONZE
DOES IT.

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

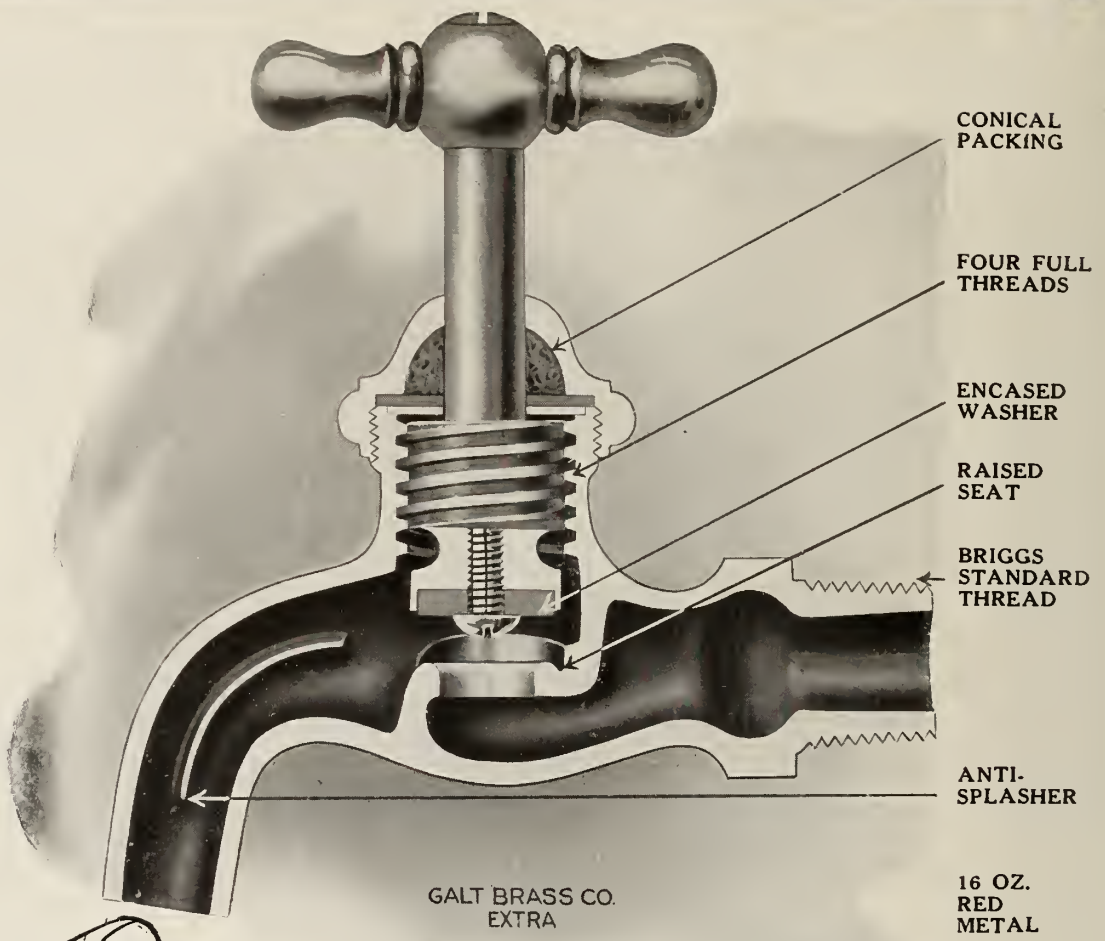
Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

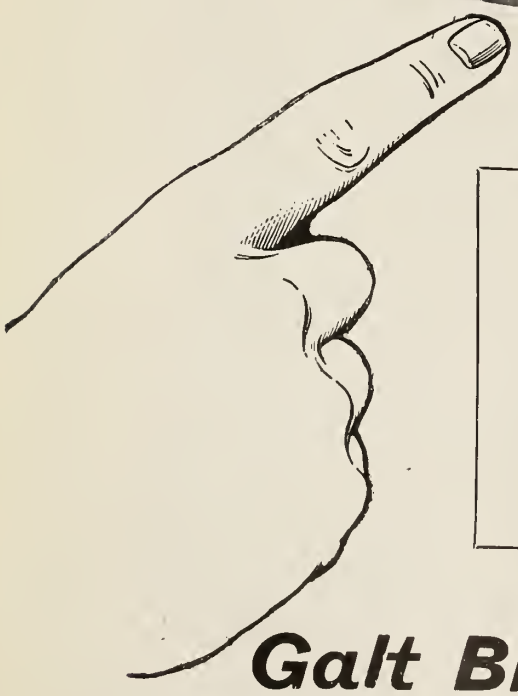
Approved by the Fire Underwriters Association, and Registered by Boiler Inspection Departments of Ontario, Saskatchewan and Alberta.

THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Registered **PERFECTO** *Trade Mark*

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, NOVEMBER 1, 1917 | No. 21

FILE COPY



OLYMPIC—Plate A15D

Quietness is a real closet Virtue

We lay stress on the fact that Empire Water Closets operate quietly because quietness of operation is one of the strongest selling points a closet can have. The householder whom you are trying to interest in an Empire Closet has experienced, either in his own home or in that of a friend, the embarrassment caused by a noisy roaring closet with a "whistling" tank.

So when you point out to him that Empire Closets operate smoothly and quietly, he readily realizes the advantage of this feature. Then, when you show him an Empire Closet

Combination set up, or even a good illustration, the perfect, neat, graceful design just about closes that sale.

Empire Closet Combinations are supplied with any style or finish closet seat. Oak, Birch, Mahogany, or the genuine sheet pyrolin white seats, with no exposed metal.

We also carry in stock all lines of Oak or Vitro Tanks as well as Water and Oil Controlled Flush Valves.

Empire Manufacturing Co.
Limited

London **Toronto**

"Everlasting" Glass Floats

are effective, durable, powerful. Will close off any pressure up to 200 pounds.

FILE COPY

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for **BEAVER BRAND CAST IRON ENAMEL WARE**

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

ONTARIO:
Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Prompt Service

Our factories never were in better position to give prompt attention to orders. That means rubber needs for Engineers and Plumbers can be delivered with a promptness that is sure to please.

And to further facilitate deliveries, reserve stocks are kept at all our service branches throughout Canada. Your orders, sent direct to our nearest branch, will receive prompt and intelligent attention.

WE AIM TO SERVE AND PLEASE THE TRADE.

Canadian Consolidated Rubber Co. Limited

Head Office - - MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

The Largest Manufacturers of Rubber Goods in the British Empire.

WE SPECIALIZE

In the Manufacture of

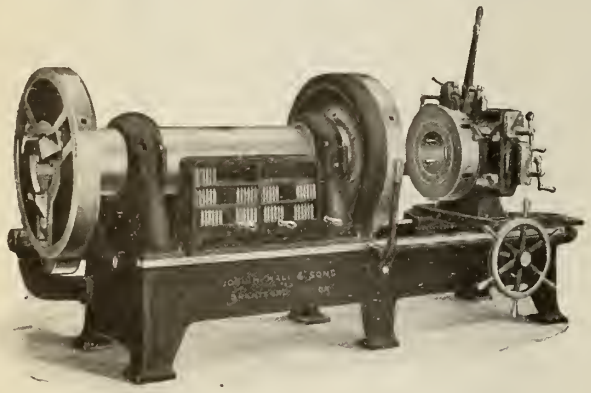
CAST IRON SOIL PIPE and FITTINGS

as well as

GALVANIZED RANGE BOILERS AND EXPANSION TANKS
FOR HEATING SYSTEMS

TORONTO HARDWARE MFG. CO., LIMITED

Pipe Machines of Merit



THE HALL No. 8

Duplex Improved Gear Box Driven. Capacity 2½ in. to 8 in. inclusive.

Note the drive belt at rear out of operator's way. Elevated die cabinet, control lever and speed levers all convenient to operator's right hand. Sliding die head.

These machines are equipped with a friction clutch, enabling operator to revolve pipe a few inches, if necessary.

Pipe Machines ranging from ⅛ to 18".
Nipple Machines ranging from ⅛ to 4".
Roller Pipe Cutters ranging from ⅛ to 4".

Delivery from stock.

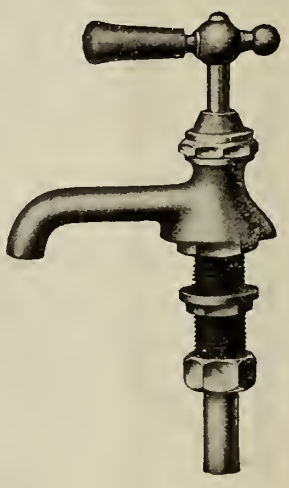
Write us for full particulars and prices.

John H. Hall & Sons, Ltd., Brantford, Can.

Joseph Breeden & Co., Ltd.

NEW MILL WORKS

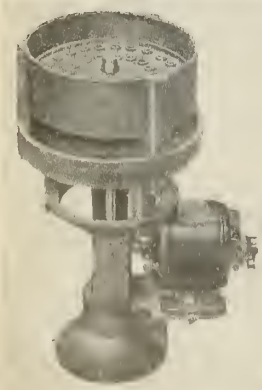
Fazeley Street, Birmingham, England



MANUFACTURERS OF

HIGH CLASS

Steam and Water Fittings



NEW DIFFERENT BETTER

The cost of coal is a serious problem to-day. Your customers have all tried to solve it and failed. We have tried and succeeded.

ROTARY OIL BURNER

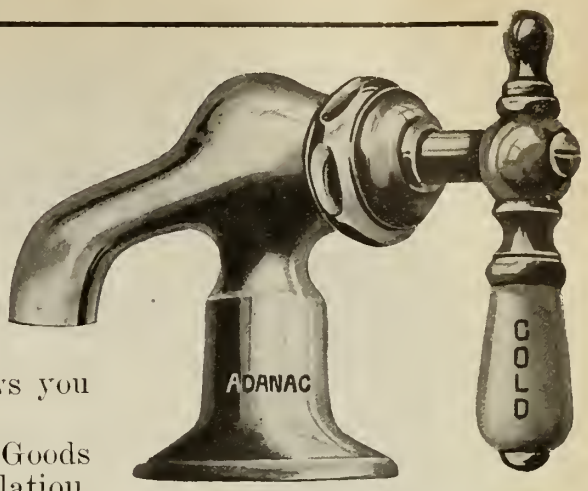
is the result of our labors. It burns fuel. oil, or kerosene. Can be installed by any plumber. Works in connection with present heater. Installed in the fire-box, gives a terrific fire in a few seconds. Can be turned off instantly when not needed. No trouble to take care of. Big profits for the plumber and an unlimited field.

NATIONAL ROTARY OIL BURNER COMPANY

235 Congress Street, BOSTON, MASS.

PROGRESSIVE REPRESENTATIVES WANTED EVERYWHERE.

Do your installations "boost" or "knock"?



Did you ever stop to conside rthat every time you install "cheap" fixtures you start a wave of talk to the effect that you do "cheap" work? Every friend and acquaintance of the party for whom you made the installation eventually knows you put in the job and judges you by it. But—

If you always recommend and install C. B. Brass Goods you gain a reputation, strengthened by each installation, for doing work "better than most." This reputation means more business and better prices.

C. B. Goods are made of special formula, full weight red metal, and every piece is fully inspected before leaving the factory. You are assured that C. B. goods will always be up to standard and will fulfill your most exacting requirements.

The Canadian Brass Co., Limited

GALT, ONTARIO

Toronto Office: 159 West Richmond Street

TRADE B.O.T. MARK

This Trade Mark stands for "Perfection" on a Water Tank Seat or Bowl. Install nothing else and be proud of your job—and satisfy your customers.

ONE MAN DOES WORK OF TWO

WITH THE

"Jardine" and "Toledo" Pipe-Threading Tools



"Jardine" Adjustment Ratchet-Threading Tool

Capacity 1" to 2" inclusive, Right or Left. Ratchet allows threading to be done in ditches or positions close to walls or ceilings. Leading screw completely enclosed, excluding chips and dirt.

MADE IN CANADA

There is a consideration that should command the attention of the man who studies economy—one man doing the work of two, by the use of **"JARDINE"** OR **"TOLEDO"** DIES. With ONE CUT of these dies you can make clean and perfect threads, just as good as if turned out on a lathe. There is undoubted money-saving value in the "Jardine" or "Toledo" Dies. You can see it at a glance.

No cams or jimcracks to get out of order. There is a set of cutters for each size of pipe. The head screw ensures perfect pitch and form of threads. They are adjustable to all variation of fittings. They stand wear, too.

You need not take our word for it. We'll supply you with names of "Jardine" and "Toledo" users in your town and you can profit by their experience.

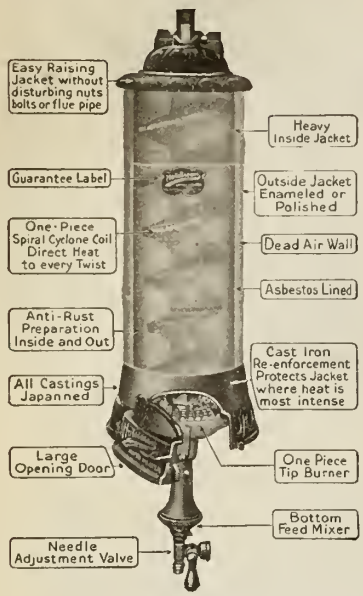
WRITE FOR CATALOG OF COMPLETE INFORMATION.

A. B. JARDINE & CO.

HESPELER, ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.

Service-Speed-Economy



The Hotstream HEATS IN A HURRY TRADE MARK REG. WATER HEATER

BEST FOR BAD WATER

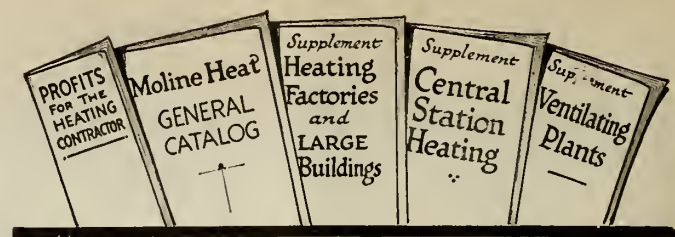
Quality Survives

Also Made With Cast Iron jacket.

The Hotstream Heater Co.

CLEVELAND, OHIO

W. H. CUNNINGHAM, 98 Kingswood Rd., TORONTO
Canadian Representative



These Valuable Books *Free!*

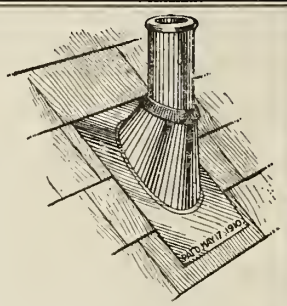
Each one is worth big money to you. Every heating contractor should have them. They cover all the latest money-making ideas in figuring and installing steam heat—hot water heat—vapor heat—and vacuum systems.

These books will help you to land more orders and increase your profit on every job. Write for them at once. They are absolutely ***FREE!***

Moline Heat EVERYWHERE

Moline Illinois

The "Simplex" Roof Flashing



The shape of the sleeve makes it possible to fit any pitch roof from 50° to flat. Made of very best galvanized iron or copper with pure lead collar. This is the simplest and best adjustable roof flange on the market.

Ask your jobber to supply "Simplex" on your next order.

SIMPLEX SALES COMPANY

313 Clinton Street CHICAGO, ILL.

Canadian Representative: W. H. CUNNINGHAM, 98 Kingswood Road TORONTO, ONT.

IT IS IMPORTANT!

If you have something to dispose of in goods or service that as many buyers as possible get to know you and your product. This can be accomplished through

Sanitary Engineer

143 University Avenue, Toronto

"B & C"

COMBINATION

Floor and Ceiling PLATES



No. 10 Steel
3-8 In. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

Send for catalog of complete line.

MANUFACTURED EXCLUSIVELY BY THE

Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:

W. H. CUNNINGHAM, 98 Kingswood Rd., Toronto, Canada.

THE CRANDON NO. 42 TANK TYPE THERMOSTAT



is a thoroughly reliable automatic control for hot water.

The thermostatic bar comes in direct contact with heating surface of tank or pipe, insuring perfect control.

Attractive discounts.

Write for booklet to-day.

DARLING BROS., LTD.

MONTREAL, CANADA

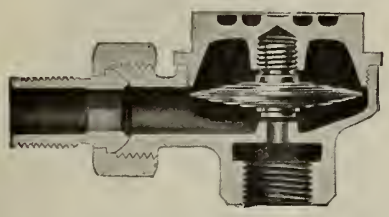
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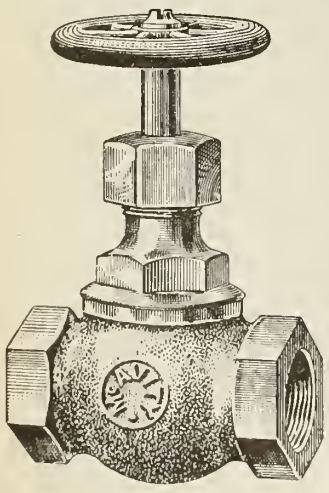
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"MADE IN CANADA"

SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. | TORONTO, NOVEMBER 1, 1917 | No. 21

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SANITARY ENGINEER

VOL. XI NOVEMBER 1, 1917 No. 21

True Conservation is Thrift

Water Costs Money—It Would Cost Less to Save it—No Real Sacrifice Necessary—Money Saved is Money Earned—Port Arthur Uses More Water Than Toronto and Toronto Comes Second.

IT is not very often that we find the daily or even weekly newspapers take up matters that can be remedied by the average householder, but there is at least one exception and that, the *Daily News-Chroncile* of Port Arthur.

The average newspaper editor or publisher does not care to be bothered with matters that have anything to do with technical problems, and that is the reason why almost every editor of a technical journal is fought shy of by the newspaper men.

If newspaper editors would once in a while look over a technical journal and pick out just those items of personal interest to the householder (and there are many), our citizens would become better acquainted with some of the progressive strides being made along all lines. If a few of these newspaper men had read SANITARY ENGINEER as far back as 10 years ago the public would know what our town and city engineers, waterworks men, etc., cost our cities, in not making known their views as regards the awful waste of water which is everywhere rampant.

According to our Port Arthur contemporary, it requires 160 gallons per day per person to keep the population in a state of good health and cleanliness, while Birmingham, England, only uses 32 gallons per person, just one-fifth the quantity, and the latter city is located in what is said to be the "black country" because of its smoke, grime, etc.—the Pittsburg of England.

The accompanying table shows the amount of water that has to be pumped to supply a number of the principal cities of the world:

Toronto	118 gallons
Winnipeg	56 gallons
Belfast	48 gallons
Birmingham	32 gallons
Dublin	46 gallons
Edinburgh	56 gallons
Glasgow	76 gallons
Liverpool	42 gallons
London	43 gallons
Boston	91 gallons
Cleveland	96 gallons
Milwaukee	89 gallons
St. Louis	92 gallons
Port Arthur	160 gallons

Now the question is: What is the rem-



No. 1
Water just dropping
13 gallons per day.
91 gallons per week.
4,745 gallons per year.
Cost per day.....$0.0017
Cost per week..... .012
Cost per year..... .60



Fig. 2
Water leaking through 1/32 of an inch aperture
204 gallons per day.
1,428 gallons per week.
74,460 gallons per year.
Cost per day.....$0.03
Cost per week..... .18
Cost per year..... 9.46



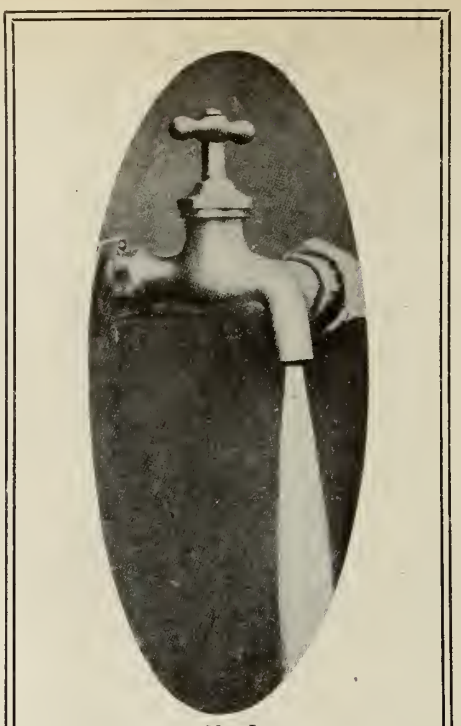
No. 3
Water leaking through 1/16 of an inch aperture
896 gallons per day.
6,272 gallons per week.
327,040 gallons per year.
Cost per day..... $0.11
Cost per week..... .80
Cost per year..... 41.53

edy? SANITARY ENGINEER has done much in urging that better quality goods be installed, and we know many improvements have been effected as a result.

We have endorsed and do still unconditionally endorse the placing of a name on every article, so that if a ball cock, or other appliance shows that it is not standing up as it should, and proves that it is inferior, that manufacturer whose name or mark appears on the goods can be consulted. Four or five years ago there were quite a lot of brass goods that could not be identified. But such goods are few and far between today, which is a great credit to the manufacturer as well as to the good judgment of the sanitary and heating trade.

That we should practise thrift is admitted by all to be very necessary, but why conserve at one end and waste at the other? Why not conserve by adopting methods that will result in stopping the waste?

Those are the questions we should all be interested in, and sanitary engineers can do their part in refusing first to be partners of price. When a customer comes into your store and wants a "cheap" tap, tell that customer that you can prove there "aint no sech animile" but that you have a real cheap tap on hand that will cost at first possibly 3 times as much as a "cheap one" but that it will not require a washer on for years, that you sell only the goods that keep tab on the water rates, and show how and why.



No. 5
Water leaking through ¼ of an inch aperture
11,016 gallons per day.
77,112 gallons per week.
4,020,840 gallons per year.
Cost per day.....$ 1.40
Cost per week..... 9.79
Cost per year.....510.65



No. 1
Water leaking through ⅛ of an inch aperture
3,165 gallons per day.
22,155 gallons per week.
1,155,225 gallons per year.
Cost per day.....$ 0.40
Cost per week..... 2.81
Cost per year.....146.71

Just imagine what would be the results if meters were placed on every water service, and every citizen in Canada were allowed to use say 50 gallons per day, and an extra charge were made for all over that. What would be the results again let us ask? Fifty gallons per day per person would mean that a house occupied by 6 persons would be able to use about 43 cubic feet of water, a chunk of ice 3 feet by 3 feet by 5 feet high could just about be made out of water needed for one day by 6 persons.

But look for a moment at the size of the block of ice that could be made from the water consumed or used by a person living in Port Arthur, about 137 cubic feet, a block 3 feet by 5 feet by 9 feet high, a matter of about 7,672 lbs. of water for every family of 6 persons.

Do not such astounding figures lead us to think? They should, and the sooner every Canadian takes upon himself some personal responsibility, gives some thought to these things, the sooner will this war be paid for, the sooner we will be able to enjoy life to a fuller extent. We are saving money no doubt with one hand, but using a scoop to throw it away with the other.

Every house in Canada that is served with town or city water should be metered, and even though the expenditure at first might and no doubt would be great. Yet the moment these meters were put into service, a saving would be effected.

WAS HE REALLY STUPID

A young foreigner was being tried in court and the questioning by the lawyers on the opposite side began.

"Now, Laszky, what do you do?"

"Ven?" asked Lasky.

"When you work, of course," said the lawyer.

"Vy, work—"

"I know," said the lawyer, "but what at?"

"At a bench."

"Oh!" groaned the lawyer. "Where do you work at a bench?"

"In a factory?"

"What kind of a factory?"

"Brick."

"You make brick?"

"No, de factory is made of bricks."

"Now, Laszky, listen. What do you make in the factory?"

"Eight dollars a week."

"No. No! What does the factory make?"

"I dunno—a lot of money, I think."

"Now, listen! What kind of goods does the factory produce?"

"Oh!" said Laszky; "good goods."

"I know; but what kind of good goods?"

"The best."

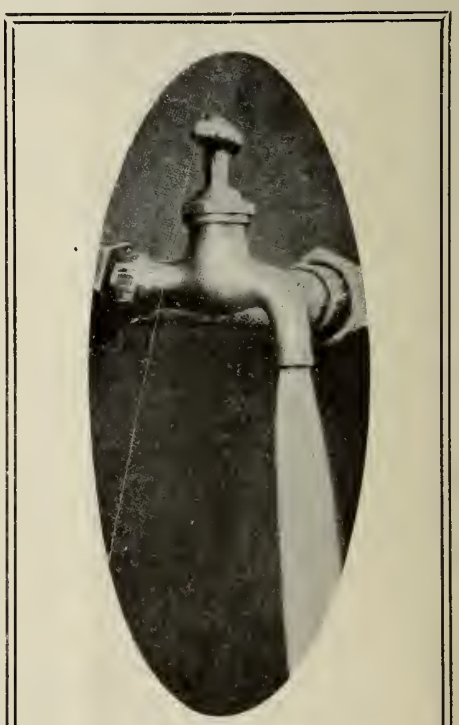
"The best of what?"

"The best there is."

"Of what?"

"Of dose goods."

"Your honor," said the lawyer, "I give it up."—"Current Opinion."



No. 6
Water leaking through ½ of an an inch aperture
46,224 gallons per day.
323,568 gallons per week.
16,871,760 gallons per year.
Cost per day.....$ 5.87
Cost per week..... 41.09
Cost per year.....2,142.71

Cast Iron: Its Rust-Resisting Power

The Corrosion Properties of Cast Iron Have Not Been Thoroughly Investigated — Recent Experiments, However, Seem to Indicate That They Refute the Electrolytic Theory.

By E. A. and L. T. Richardson, in Iron Trade Review, Oct. 18, 1917.

IN reviewing the literature relating to the corrosion of cast iron, one is unable to find any extensive references or data. This fact seems rather surprising when the many scientific tests and observations that have been made upon the corrosion of iron and steel are taken into account, the published results of which make an extensive and varied literature. The field of cast iron as regards its usefulness as rust-resisting metal has been much neglected, and today remains almost unexplored.

This is due partly to the fact that only in the last few years has the resistance of iron to corrosion been considered one of its important properties. The efforts to improve materials for structural and other purposes have been directed toward the production of a material having superior physical properties, such as tensile strength, and possessing a greater reliability. For this reason cast iron, which once was used extensively for structural purposes, has been largely replaced by steel. Cast iron is still, however, used in enormous quantities in places exposed to corroding influences and in view of this fact it is surprising that the study of the corrosion of this material has not received more attention.

The Subdivisions of Corrosion

Most of the published information relating to the corrosion of cast iron may be divided into two classes. The first of these classes consists of isolated instances where pieces of cast iron have withstood the ravages of time and corroding influences and seem to have been almost unacted upon. The second class consists of actual tests in which attempts have been made to compare the rust-resisting properties of cast iron with those of iron and steel.

The information contained in the first class will not be discussed here. It will suffice to say that many instances are known where cast-iron objects have lasted many years, even centuries, and have remained in good condition when exposed to corrosive conditions. These observations are especially interesting in throwing some light upon the electrolytic theory of corrosion which states that the more heterogeneous the material the greater its rate of corrosion. According to this theory, pure iron, steel and cast iron should resist corrosion in the order named. For more complete data on this subject, the reader is referred to "The Rusting of Iron," by J. Meehan and "External Corrosion of Cast Iron Pipe," by M. R. Pugh.

Experimental Tests

J. N. Friend tested grey cast iron and mild open-hearth steel by an alternate wetting and drying method, and found that cast iron was superior to steel. Thwait collected in 1880 all available data upon the corrosion of cast iron compared with that of wrought iron, and obtained for the relative corrosion the following results:

	Pure air	City or sea air
Wrought iron	0.655	6.690
Cast iron	0.604	2.637
Cast iron (skin removed)	0.584	4.763

Burgess and Aston tested several kinds of iron and steel under atmospheric conditions, among which were cast iron, steel and pure iron. They found the relative corrosion to be:

High purity iron	88.4
Steel	63.5 to 150
Cast iron	93.0

In regard to these tests they say, "Heterogeneity in structure of metals is generally supposed to be antagonistic to durability but this investigation shows that if it is a factor it is one of secondary significance and overshadowed by other factors."

It is evident, therefore, judging from the literature, that cast iron, in spite of its extreme heterogeneity, is rust-resisting. The data upon this subject, however, is meagre and conclusions can not be drawn from results so radically different from the predictions of such a widely accepted theory as the electrolytic until sufficient data has been obtained to warrant doing so.

The Test and Its Results

In order to add to the information already obtained upon this subject, the authors themselves conducted a test. Three kinds of iron typical of three stages of heterogeneity were chosen: grey cast iron, a low-carbon steel and a commercially pure iron. By analysis these materials contained the following impurities:

	Sulphur	Phosphorus	Manganese	Total carbon	Silicon	Copper
Cast iron.	0.059	1.020	0.480	3.260	2.400	none
Steel	0.030	0.006	0.330	0.100	trace	trace
Pure iron.	0.021	0.004	0.015	0.015	0.005	0.025

For the test, four pieces of each material were taken and carefully annealed at 750 degrees Cent., the effects of oxidation removed by filing and then accurately weighed. The pieces were all given identically the same treatment.

The test materials were examined at intervals of about one week. At the end of a month, visual observations indicated pure iron to be the best material for resisting corrosion, while cast iron and steel seemed about equal although decidedly poorer than pure iron. Later on, the rate at which the cast-iron specimens were rusting decreased and at the end of about four months cast iron and pure iron were about the same, while steel was poorer than either.

At the end of seven months the test pieces were removed, cleaned with neutral ammonium citrate and carefully reweighed. The losses computed in grams per square centimetre were:

Cast iron	0.966
Steel	1.546
Pure iron	0.771

The specimens, after cleaning, were examined in regard to condition of surface, depth of pits and uniformity of rusting. No difference could be detected between the cast iron and pure iron as regards these three points; in fact they seemed to corrode in much the same manner. The steel was, on the contrary, deeply pitted, and the rusting on the surface had been irregular.

The results of this test agree with other tests and add to the evidence already accumulated, that the resistance of an iron to corrosion does not necessarily depend upon its purity or homogeneity, as would be indicated by the electrolytic theory of corrosion. This theory, in its present accepted form, does not explain the great resistance offered by cast iron. While it may be true that the initial rusting is largely electrolytic in character, other factors, such as the adherence of the rust and the protection thereby given to the metal, come into operation and outweigh any electrolytic corrosion—a conclusion arrived at by other observers.

Governor Livingston Beeckman, of Rhode Island, said in Providence, apropos of the gigantic strides that the temperance movement is taking:—

"The whole country now seems to look at excess as the young wife did.

" 'Jim, dear,' said a young wife, 'I do wish you'd stop drinking. Every time you go to one of those banquets of yours you get up the next morning pale and silent, you eat nothing, and just gulp down ten or fifteen glasses of water. Do stop drinking, won't you? I know it can't be good for you, dear.'

" 'All great men have been drinking men,' said Jim. 'Look at Edgar Allan Poe, look at Charles Lamb, look at Burns, look at——'

" 'Well, Jim,' said the young wife, 'you just swear off till you become a great man, too, and I'll be satisfied.' "

Create a Special Buying Account

How a Wife Actually Built up a Business on Her Own Savings, Earned in the Business—Making it Possible to Save as High as 40 Per Cent.—A Real Business-building Idea, With Compound Interest.

By Thomas Stansfield

COST of doing business, overhead expenses, saving the 2 per cent. by paying cash in 10 or 30 days, all are to thousands of businessmen on this continent very much out of the question. Talk about cost of doing business—I once heard a story about a printer who had figured so low on a job that it became the talk of the town and surrounding district in printerdom, and so it was decided that a couple of members of the trade should call upon the successful bidder.

Our worthy pair got next to him and in as few words as possible got down to the point and asked him where he could buy even the paper alone for the price tendered, to say nothing of overhead, ink, time setting up the type, etc. This is something like the way he replied. "Well, I suppose you fellows think I'm some runt to take a job so cheap. You fellows are just simply bursting with 'cost of doing business' and all that kind of bunk. If you'd get down to business and work at the printing instead of training to be bum accountants you'd find out something worth while knowing.

"However, as you've put it so blamed nice, I'll just tell you all where you get off at. I'll just let you into the secret as to how I simply made heaps of profit on that job, in fact it was all profit.

"First of all, the stock was on my shelves for about 10 years and I couldn't get rid of it at any price, so it was real dead stock, costing me rent and storage to keep. Next the ink I used, I got as a sample and it didn't cost me a red cent. I didn't have a job in at the time and the machinery would have been standing idle eating its head off anyway, so that it did it good to get a run, and as for the setting up of the job, well my own daughter just didn't have a thing to do, so she did the job and as she had to be fed anyway that cost nothing. So you see gents I made a clean profit of every red cent I got for that job. Don't for the love of mud try to show me where I could make more money than that on a job, because I would not have the nerve to take the money."

And that's just about the way some of our fellow craftsmen must figure on the jobs they get, judging by the ratings we see in Dun's & Bradstreet's. Just a few weeks ago I was calling upon a member of the trade and heard part of a conversation.

A customer stepped into the store and asked the price on 100 feet or so of 1 inch galvanized pipe, the price quoted was about $10.00 or $11.00 per 100 feet and pipe of that kind was being sold by the jobber at between $15.00 and $16.00, at the time. The writer made bold and asked our member of the trade to step into the back shop for half a minute, and told him about the advanced price, etc. Well! what a shock he got. He had never even given it a thought to go into such details and find out exactly what a thing cost.

It is therefore refreshing to hear at least once in a while of some one really doing things properly, and at a profit. Here is the story and it's true.

Joe Blank had been in business 3 or 4 years and never seemed to be short of money exactly, but once in a while it took some humping to meet a big account. Well just about this time the book-keeper got married and left Blank in a hole. So his wife said to him one morning that as her mother was coming to live with them, she would go and keep the books for him and they would save that much, which happened to be $12.00 per week. Well the arrangement worked fine. The wife fixed up the shop, got an extra fixture or two put into one end of the store, made things look a little more business-like, all because some of her girl friends got into the habit of popping in during the day and asking her how she liked to be "a plumbers' wife, etc." Not only so, but as a few of them were planning to become some fellow's wife at a later date, they got talking bathrooms and fixtures until Blank's wife very soon bloomed out to be a first class business getter, and in some way or other money appeared in a way to become a shade easier getting. So one morning at breakfast Joe's wife asked if he couldn't see his way clear to pay wages for services rendered as he had done in days previous to the book-keeper getting married, and after a little coaxing the wife agreed to take $15.00 a week, after giving about 6 months in free as a starter.

Well, about a year and a half went by, and things were still improving when a fairly good job, as jobs ran with Blank, came his way, and it meant about $1,000 worth of material alone, and our book-keeper began wondering if it would be possible to make a few dollars on the side, so one evening at nearly quitting time, a traveller from ———— plumbers' supplies came along, and after asking if he could book a small order, the wife said to him. "Look here Mr. Brown I suppose you heard we got that job? Well I want to know what discount you can allow for a 'cash with order' proposition, the order will amount to about $1,000?" Brown nearly took a blue fit. He had never in the whole course of his existence been confronted with such a proposition. But when he found it was a gilt edged offer he began to do some tall thinking and finally determined to phone the house; he did, and was instructed to allow 5 per cent. cash in hand with the order.

Our book-keeper wife had banked every cent of her earnings, and began from that day to "buy for cash." During the first year that $1,000 was turned over exactly 8 times, and 8 times 5 per cent. is 40 per cent., and 40 per cent. on one thousand dollars amounts to $400.

Now, what moral, or example do we find in that story? Not that the wife of every member of the trade should tackle the book-keeping, or even go near the shop. But simply this, that of all things necessary, there should be a sinking fund created in every man's business. There should be no business building on increased credit accounts. There should be no buying at 90 days simply because your credit is good. There should be no discounts sacrificed, but rather the other way about.

The writer knew of a big business man who never had less than $10,000 in the savings bank, but at the same time his business was always in debt carrying current accounts to the amount of $8,000 to $12,000. The lesson to be learned in simply this, that every business man should do all in his power to have a buying account, so as to not only take the regular 10 day, 2 per cent. discount, but should endeavor to "buy for cash" and make every dollar possible. The biggest business factor in the world is the man with the cash. So it should be a man's first aim when launching out in a business on his own account, to start at the beginning, create a buying fund and "Buy for Cash."

INCORPORATION

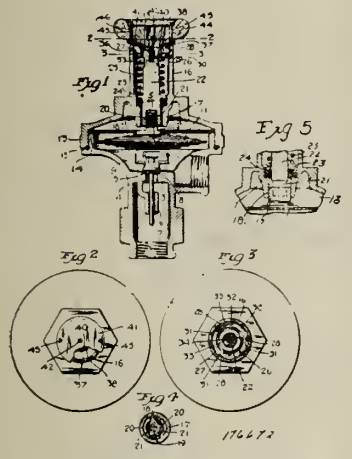
Vandorf Brick Works has been incorporated at Toronto, with a capital of $40,000, to manufacture brick, tile, fire proofing, and other clay products. T. J. Lawrence, manufacturer of Toronto, is one of the incorporators.

New Canadian Patents

No. 176,672

Clayton A. Dunham, Marshalltown, Iowa, U.S.A., 1st May, 1917; 6 years. Filed 9th June, 1916. Receipt No. 266,482.

Claim.—1. In a trap, the combination of a casing, an expansible member adjustably mounted on said casing, a valve connected with said expansible member, an adjusting stem having a sliding connection with said expansible member at one end and provided with teeth at its other end, a ring provided with teeth engaging the teeth of said stem, and means for limiting the rotary movement of said ring.



No. 176,672. Steam Trap.

2. In a trap, the combination of a casing, an expansible member adjustably mounted on said casing, a valve connected with said expansible member, an adjusting stem having a sliding connection with said expansible member at one end and provided with teeth at the other end, and means for engaging said teeth to limit the rotary movement of said stem.

3. In a trap, the combination of a casing, an expansible member adjustably connected with said casing, a valve connected with said expansible member, an adjusting stem adapted to rotate said expansible member and having a sliding connection therewith at one end and provided with teeth on its other end, a ring provided with inner teeth engaging the teeth of said stem, and an outer ring adapted to limit the movement of the inner ring.

4. In a trap, the combination of a casing having a cylindrical extension, an expansible member adjustably mounted on said casing, a valve connected with said expansible member, a ring secured to the interior of said extension and provided with an inwardly extending lip, an inner ring provided with a lip adapted to contact with the lip of said first-named ring, and provided with an interior thread, means for holding said rings in position, and a valve adjusting stem provided on one end with teeth engaging the teeth of said inner ring, said stem having a limited longitudinal movement independently of said inner ring.

5. In a trap, the combination of a casing having a cylindrical extension, an expansible member adjustably mounted on said casing, a valve connected with said expansible member, a valve adjusting stem having a limited longitudinal movement and provided with teeth on one end, a ring having teeth engaging the teeth of said stem, means for limiting the rotary movement of said ring, and means for holding said ring in position.

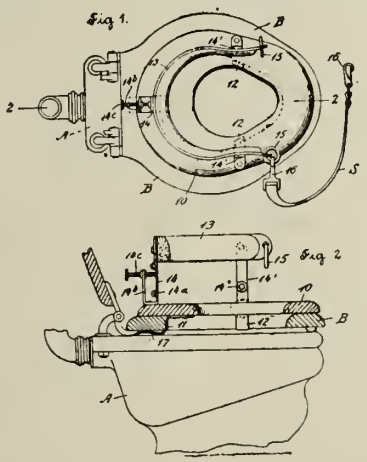
No. 176,359

Richard Jackson, Jr., Detroit, Michigan, U.S.A., 29th May, 1917; 6 years. Filed 4th March, 1917. Receipt No. 262,421.

Claim.—1. An auxiliary seat comprising an apertured plate, means for holding said auxiliary seat on the regular seat, guard band, means for variably positioning said guard band on the seat plate relatively to the aperture thereof.

2. An auxiliary seat comprising an apertured plate smaller than the regular seat, means for securing the same to the regular seat, a guard band, and hinged posts for supporting said guard band for forward and backward movement relatively to the aperture in said plate.

3. An auxiliary seat comprising an apertured plate smaller than the regular seat, means for securing the same to the regular seat, a guard band, and hinged posts for supporting said guard band for forward and backward movement relatively to the aperture in said plate, and



No. 177,359. Seat for Closets.

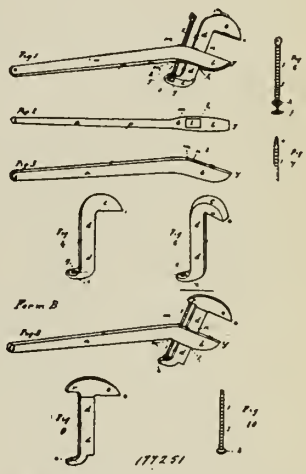
means carried by said plate for limiting the movement of the guard band.

4. An auxiliary seat comprising an apertured plate smaller than the regular seat, means for securing the same to the regular seat, a guard band, and hinged posts for supporting said guard for forward and backward movement relatively to the aperture in said plate, and a screw supported on said plate and engaging one of the supporting posts of the guard band, for limiting backward movement of the same.

No. 177,251

Peter William Hallvarson, Black Diamond, and Frederick William Varley, assignee of a fourth interest, Okotoks, both in Alberta, Canada, 22nd May, 1917; 6 years. Filed 21st August, 1915. Receipt No. 255,227.

Claim.—1. In a wrench, the combination of (1) a handle angularly bent, with



No. 177,251. Wrench.

the hollow of the bend on its under side, in one piece with the lower stationary jaw, the piece being perforated perpendicularly from the upper to the under side of same in the direction of the jaw beyond the bend, with respectively, (a) a circular screw-threaded hole and (b) a smooth faced hole shaped similarly to a rectangularly cross section of the adjustable bar; (2) a movable perpendicularly adjustable bar with an extension forming the upper jaw at its upper end projected in the same direction as, parallel to, and in perpendicular and longitudinal alignment with the lower jaw, with two rectangular abutments respectively at the ends of the bar and in alignment with the jaws, the bar being in place in the said smooth faced hole, and (3) an adjusting screw in place in the said screw-threaded hole, all substantially as set forth.

2. In a wrench, the combination of (1) a handle angularly bent with the hollow of the bend on its under side, in one piece with the lower stationary jaw, the piece being perforated perpendicularly from the upper to the under side of same in the direction of the jaw beyond the bend, with respectively (a) a circular screw-threaded hole, and (b) a smooth faced hole shaped similarly to a rectangular

cross section of the adjustable bar (2) a movable perpendicularly adjustable bar in place in the said smooth faced hole, provided with an extension forming the upper jaw at its upper end projected in the same direction as, parallel to, and in perpendicular and longitudinal alignment with the lower jaw, with rectangular abutment at one end of the bar pierced from its upper to its under side with a smooth-faced perforation corresponding with, and admitting the passage through it of, the adjusting screw, and (3) an adjusting screw in place in the said screw-threaded hole, one end of the screw passing loosely through, but firmly attached to the said perforated abutment, all as and for the purpose set forth.

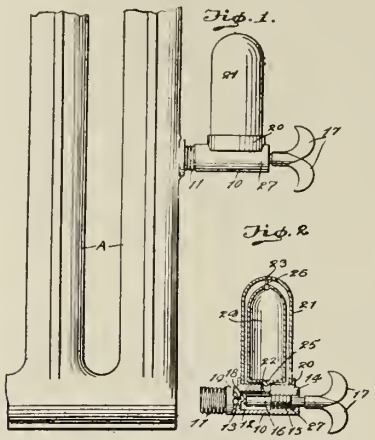
3. In a wrench, the combination of (1) a handle angularly bent with the hollow of the bend on its under side, in one piece with the lower stationary jaw, the piece being perforated perpendicularly from the upper to the under side of same in the direction of the jaw beyond the bend with respectively (a) a circular, screw-threaded hole, and (b) a smooth faced hole shaped similarly to a rectangular cross section of the adjustable bar; (2) a movable perpendicularly adjustable bar in place in the said smooth faced hole, provided with an extension forming the upper jaw at its upper end projected in the same direction as, parallel to, and in perpendicular and longitudinal alignment with the lower jaw, with rectangular abutment at one end of the bar pierced from its upper to its under side with a smooth faced perforation corresponding with, and admitting the passage through it of the adjusting screw; (3) an adjusting screw in place in the said screw-threaded hole, one end of the screw passing loosely through, but firmly attached to the said perforated abutment, and (4) a thumb nut with limited scope of revolution on that end of the adjusting screw projecting through the perforated abutment, all as and for the purpose set forth.

NO. 177,035.

Zachariah T. Scott, Conton, Illinois, U.S.A., 15th May, 1917; 6 years. Filed 27th March, 1917. Receipt No. 277,601.

Claim.—1. In a device of the character described, a tubular body portion, a valve stem operating in said body portion, means to actuate said valve stem, a casing carried by said body portion, said body portion being provided with an opening communicating with said casing and the interior bore thereof, the upper end of said casing provided with an air vent, a float arranged in said casing, a nipple on said float to normally close said opening and a pin carried at the upper end of said float to close said air vent, as and for the purpose specified.

2. In a device of the character described, a body portion having an interior bore, a valve stem operative in the interior bore of said body portion, means to actuate said valve stem, means to prevent the entire removal of said valve stem from said body portion, a casing detachably supported by said body portion, an opening in said body portion establishing communication with said casing and the interior bore thereof, the upper end of said casing provided with an air vent, a float arranged in said casing, a nipple formed at the lower end of said float to normally close said opening, and a pin carried at the upper end of said float to close said air vent at



No. 177,035. Valve for Radiators.

certain times, as and for the purpose set forth and described.

3. In a device of the character described, a body portion having an interior bore, said bore being enlarged at a point intermediate the ends of said body portion, a portion of said bore being provided with screw threads, a valve stem positioned within said bore, an enlargement on said valve stem provided with screw threads for engagement with the correspondingly screw threaded portion of said bore, means to facilitate the actuation of said valve stem, a bevelled head at one end of said valve stem, a correspondingly formed valve seat formed at one end of the enlarged portion of said bore, a collar carried on said body portion, the inner periphery of said collar being provided with screw threads, a casing open at its lower end and provided with screw threads adjacent its lower end for reception in said collar, said body provided with an opening communicating with the enlarged portion of said bore and the interior of said casing, the upper end of said casing being provided with an air vent, a float arranged in said casing, a nipple carried by the lower end of said float to normally close said opening, a pin carried at the upper end of said float to close said air vent at certain times, and a pin arranged transversely of said body portion and cooperating with said enlargement on said valve stem to prevent the entire removal of the latter, as and for the purpose set forth and described.

No. 176,748.

The Dominion Radiator Company, Limited, Toronto, Ontario, Canada, assignee of Charles R. Fowler, Philadelphia, Pennsylvania, U.S.A., 1st May, 1917; 6 years. Filed 11th January, 1917. Receipt No. 274,204.

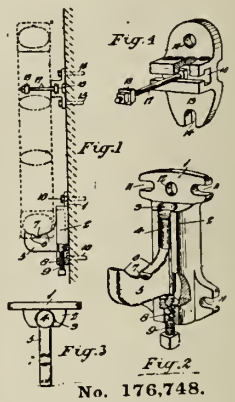
Claim.—1. In a device of the character stated, the combination of a radiator support and means for mounting said support whereby the support can move laterally about a vertical axis under either expansive or contractive movement of said radiator.

2. In a device of the character stated, the combination of a base adapted to be secured to a fixed part, and a radiator support pivotally carried by said base for lateral movement in a horizontal plane.

3. In a device of the character stated, the combination of a base adapted to be secured to a fixed part, a substantially cylindrical slotted bearing formed in said base, a pivot member mounted in said bearing for free turning movement, and a radiator support connected to said pivot member and extending laterally from said base whereby a radiator seating upon said support is held in operative position and is free to expand and contract.

4. In a device of the character stated, the combination of a base adapted to be secured to a fixed part, a radiator support pivotally carried by said base for lateral movement in a horizontal plane, and means to adjust said support longitudinally of said base.

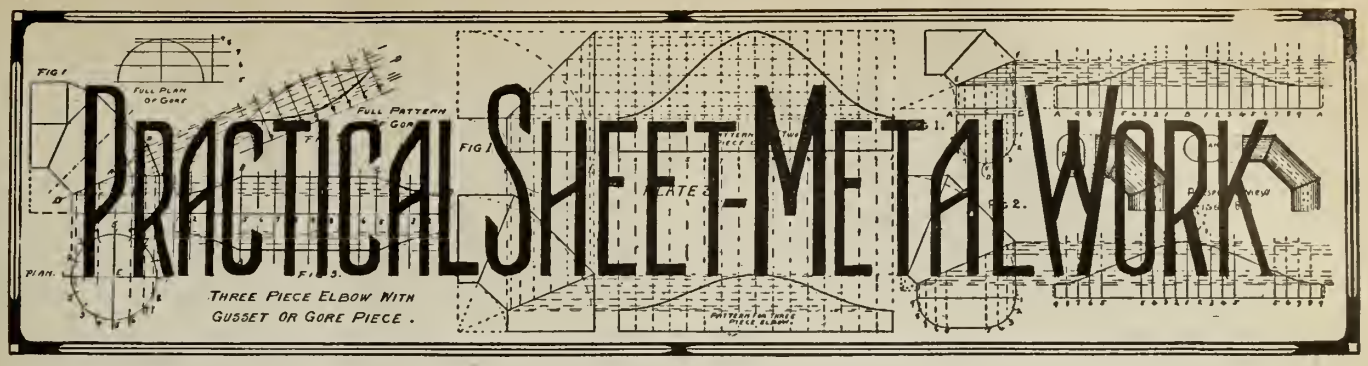
5. In a device of the character stated, the combination of a base adapted to be secured to a fixed part, a support pivotally carried by said base and adapted to



No. 176,748.
Support for Radiators.

support a radiator and move laterally with said radiator under expansive and contractive movement, and means between said support and radiator to prevent displacement of said radiator.

6. In a device of the character stated, the combination of a base adapted to be secured to a fixed part, a support pivotally carried by said base and adapted to support a radiator and move laterally with said radiator under expansive and contractive movement, means between said support and radiator to prevent displacement of said radiator, and means to adjust said support longitudinally of said base.



BY THOMAS STANFIELD

THE question of humidity is one which the average heating engineer appears to know very little about, and particularly those who instal warm air furnaces. This is a matter for regret, seeing that all the air heated in a warm air furnace must pass very close to the red hot fire pot, which makes it very dry, much more so than is the case where steam or hot water heating systems are installed.

One of the chief arguments which the opponents of warm air furnaces use is that "the air is burned dry," is dusty, and, therefore, not healthy. Furniture cracks, etc., etc., and no doubt these arguments are only too true.

These conditions should not and would not exist if the person installing warm air furnaces would become thoroughly acquainted with the question of providing adequate means to furnish sufficient humidity.

Rgearding the cracking of furniture, this is a common thing to see. What do such actions teach us? Simply that air if too dry will absorb moisture from anything with which it comes in contact, whether furniture or human beings. That is the reason why thousands of persons have become victims of bronchial troubles, sore throats, etc, because the air has taken off too much moisture from the lungs, throat and nose, and the warmer the air, the more moisture it will absorb.

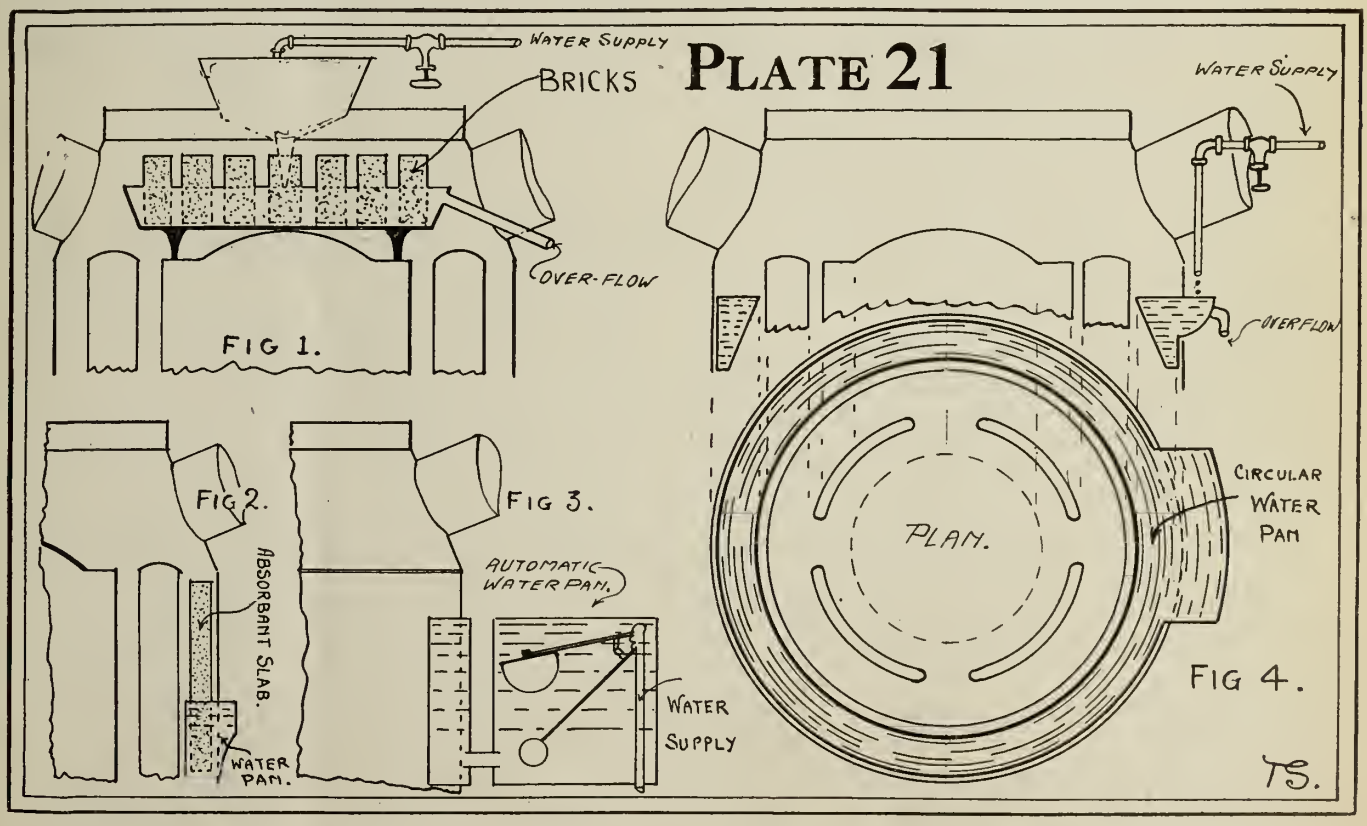
At the time of writing the temperature is standing at 89 degrees Fahr. in the shade. Just imagine the amount of water a person could drink during such a period, and the heavy perspiration which can be created. The furnace should be charged just as liberally with water during its operation.

Cold fresh air is much more difficult to heat than warm, not altogether because of the latter being warmer, but because cold air contains less moisture. Atmosphere at zero contains, we are told, only one per cent. of moisture, and the human body requires at least a humidity of 55 per cent.

Just to show the fuel value of moisture, consider that in the spring time, just as the snow has been either evaporated or absorbed, we find a temperature of 65 degrees very comfortable, as well as exhilarating. Why? Because there is a present humidity of approximately 55 degrees. Then why not create such a condition in the home in winter, particularly when a great saving in fuel can be effected?

Most houses are heated to 70 degrees when 65 would be much more healthy with a reasonable amount of humidity. The small water pan generally furnished with warm air furnaces is nothing bet-

(Continued on page 30)



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TENDENCY OF FUTURE INDUSTRIAL CONDITIONS

ONE of the chief results of the international co-operation resulting from the war, and one which will have the most lasting results on the welfare of both individuals and nations is the increased interest which employers have been compelled to take in the conditions of employment under which working people spend their lives producing the goods to form the basis of any one nation's trade. In view of the increased participation by this country in the world's commerce and the prospective, nay, the certain requirements in skilled labor necessary to the attainment and maintenance in international trade, it devolves upon all responsible bodies and individuals concerned with productive labor, to look closely into the quality of the help on which their future success depends.

In the discussion of such a subject at this time, the question of remuneration can be discounted; numerous anomalies in the matter of equitable payment for services rendered have been, and probably still are in existence, the adoption of unskilled but adaptable help on piece-work and premium systems, and the urgency of many war-time contracts which were chiefly responsible for these conditions in all countries rendering the wages question a negligible factor in international comparisons.

The ultimate and permanent industrial success of any one nation is being decided now; not so much by the production of munitions, ships and other vital needs of the moment, as by the manner in which the great supply of suitable manufacturing help brought to light is being absorbed, trained, and educated with a view to remaining a producer for the present and becoming a skilled worker in the future. Despite the adaptability shown by many adults during the last two years the indisputable fact remains that skilled engineering help must be bred from its youth up and the country, whose manufacturers recognize this fact and act accordingly, will easily and completely outdistance those who continue in the belief that the demand will create the supply.

CONSTRUCTIVE DISCONTENT

PROGRESS is only possible where the spirit of dissatisfaction prevails; not the dissatisfaction that tends to indifference to or breeds irritation with conditions or environment, but that feeling of discontent that haunts and impresses the mind with the thought that one is not living up to and making the most of the opportunities that arise from day to day. Knowledge is acquired when we begin to study the why and the wherefore of our surroundings. Gravitation was realized long before Newton appeared on the scene, but it was to the fact that he was not content to take the falling of an apple as a mere incident that resulted in the establishment of the law which defines to us the attraction of the earth for other and smaller bodies.

Discoveries are seldom a matter of chance; they are more often the culmination of many weary hours, or perhaps days and weeks of ceaseless thought and observation. It is unquestionably true that worthwhile achievements are the work of a few individuals; these and these only being responsible for the various departures from time-worn precedents.

Despite the fact that all are endowed with the same faculties, the great majority are content and willing that a few only shall develop these faculties to the point where an enlarged imagination becomes the source of dissatisfaction that eventually results in the attainment of ideals which are the foundation stones of success. The man who is content with his present condition has lost all initiative. Breaking new ground, as it were, is expressive of discontent with things as they are. When uneasiness of mind is of a constructive nature, the consequence cannot be other than progressive; on the other hand, dissatisfaction that hinges on indifference is destructive and an obstacle to progress rather than otherwise.

THE NEW WAR LOAN

CANADA is about to call for another War Loan. It is necessary to raise funds to meet the increasing cost of maintaining the Canadian Expeditionary Forces; it is necessary for supplying additional credits in Canada to enable Great Britain and the Allies to continue to purchase agricultural products, munitions and other war supplies in Canada.

The safety of a Canadian Government Bond is secured by the entire resources of the country, the safest security obtainable—in fact, you really hold a mortgage on Canada, one which will pay you a much higher rate of interest than can be obtained on any other equally or nearly as safe security.

There should be a Bond in every household in Canada. This is a privilege and a patriotic duty, and it is to be hoped that every individual in Canada will secure a Bond or at least a War Savings Certificate.

The money markets of the United States and Great Britain are practically closed to Canada now

and the Government cannot count on the large subscriptions from outside of Canada that were secured in the preceding loan. The necessity of everyone doing his or her bit must be emphasized.

You do not necessarily tie your money up for 20 years in buying a bond. It is negotiable and this feature should not be overlooked. Canadian Government Bonds can be sold at any time or can be used as security for temporary advances from a bank. The purchaser can get his money back (through a sale) whenever he wants it.

SANITARY ENGINEERING AND ITS RELATIONSHIP TO THE HEALTH DEPTS.

NO matter from whatever angle we view the question as to which civic department the plumbing inspection branch should be attached, viz., the health department, city engineer, city architect, or building inspection department, there is one important matter that must not be overlooked. The work of the plumber or sanitary engineer, or whatever he be named, has a direct bearing upon the health of the people whom we serve. It is a class of work that is acknowledged by all to be of greater importance than any other which goes to make a building complete. It requires the most skilled mechanic not even excepting the electrician, simply because it really is the mechanical branch of the health department.

In Montreal recently much thought has been given the matter and as a result we are pleased to note that it is now necessary for all plans of buildings of whatever nature to be submitted to the sanitary engineering department before a permit to build same will be granted.

This is one of the best steps that have been taken for some time in connection with our civic departments in Canada. Those medical health officers who wish to shirk the responsibility of such an important branch of their work are not worthy of the positions vested in them. They belong to the stand-patters; the men who should be behind counters handing out patent medicines, kill-all-and-cure-none kind of stuff.

We are often heard to refer to our Oriental brethren as being behind the times in many ways and no doubt they are, but in one matter at least they have the citizens of the Western Hemisphere beat a mile. It is a custom we have heard that medical men can only demand their fees when their clients are in the best of health. The moment one becomes afflicted with any disease, or is not in a fit state to follow his daily occupation, the fee stops, and rightly so. If such were the case in Canada we would have every medical man taking more interest in building equipment, humidifiers, furnaces, and heating systems. There would be no dusty corners in our homes; every house would be equipped with positive ventilating systems and stationary vacuum cleaners, etc., and our buildings would be far better equipped throughout.

HOW TO MAKE MONEY GROW

IN the October issue of *Conservation,* a monthly bulletin published by the Commission of Conservation, Ottawa, the above heading draws attention once more to Canada's War Savings Certificates, which can now be purchased by even the small investor. The bulletin goes on to state:

"War Savings Certificates for the small investor are almost too good to be true. They are so good that the Government will not sell more than $1,500 worth to any one person. They yield over five per cent. on the investment, may be redeemed at any time, and have the whole Dominion of Canada back of them as security. In other words, they have all the advantages of a savings bank account, but have greater security behind them and yield over two per cent. more.

The following table shows how money will grow in three years if invested in War Savings Certificates:

$	8.60	loaned	now	grows	to...	$ 10.00
	21.50	"	"	"	"...	25.00
	43.00	"	"	"	"...	50.00
	86.00	"	"	"	"...	100.00
	430.00	"	"	"	"...	500.00
	860.00	"	"	"	"...	1,000.00
	1,290.00	"	"	"	"...	1,500.00

There are, undoubtedly, many who have not looked at these certificates in this light, and will be glad to have before them details relating to the investment necessary to securing returns.

Somewhere in France is a boy, whom we know, who somehow finds time to write almost weekly to his father; and almost every letter contains somewhere, this sentence: "Tell me something about the business, dad."

Letters such as go to him would perhaps be of interest to us all, for they tell the remarkable daily story of the present remarkable business life.

—THE EDITOR.

A New Method of Estimating Radiation

Practical Working Rules, With Tables, For Using Common Heat Unit Method — Tables Showing Correct Heating For Various Kinds and Sizes of Buildings.

By Carleton F. Tweed, Chicago.

When numbering the rooms of a building to correspond to a heating schedule it is well to designate floors. Thus all numbers beginning with 100, as 105, 120, etc., are found on the first floor, while 305, 330, etc., are found on the third floor.

In reading the data from the building plans and recording them on the form, the method of procedure should be about as follows: First, fill out as completely as possible the heating data at the top of the first page. When this has been done, number the rooms in consecutive order, beginning at the lower left-hand corner of each plan and proceeding around the drawing. Inside rooms and closets which will not require a radiator should not be numbered. The next step is to record these numbers with their corresponding room names in the first and second columns of the form. Next record from the drawings, in the third column, the 3 dimensions of each room: in the fifth column on the second small line, the square feet of exposed wall surface; in the sixth column on the third small line, the square feet of exposed glass surface; and in the seventh column on the fourth or bottom line, the square feet of exposed roof or some miscellaneous form of exposure, such as a floor, ceiling, or partition, etc. All data relating to a miscellaneous should be carefully noted in remarks. Further, if, as occasionally happens, a miscellaneous and a roof exposure occur in the same room, the data relating to the former should be noted in remarks and added later to the sum in the column headed radiation sums.

Record also at this time, while taking the other data from the plans, in the column headed exposure, on which side of the building the room is located. For this use the common convention of direction, N. S. E. W., NE. NW. SE and SW. Later in the same space note the percentage factor for exposure taken from Table III.

Generally the factor KRs or KRw, as the case may be, for any one item will be the same for all the rooms on any one floor. Enter each of these different factors for volume, wall, glass, roof, etc., in the column headed factors and on the same small line as the corresponding data figures, for which it has been calculated. Thus the factor in the example 0.0114 is for volume and has been placed on the first small line opposite to the data figures for volume. Similarly the factor 0.346 is for glass and has been placed on the third small line opposite to the data figures for glass.

The designer may now take his slide rule and quickly calculate the volume of each room. This should be noted in the fourth column on the first small line. Now, to obtain the square feet of radiation necessary to compensate for the heat loss chargeable to each of the separate items it is but necessary to multiply the data figures by the factors. Each result should be carried to one decimal and recorded on the same small lines opposite of the factors in the first half of the column headed radiation sums.

When these have all been noted, their sum for each room should be determined and entered in the last half of this same column. This sum will then be the required amount of radiation for a room of southern exposure, except for the correction necessary for different heights, widths, etc.

For rooms on the more severely exposed sides of the building, multiply this sum by the percentage factor for exposure and note the amount so obtained in the column headed "corrected size," which follows. This will then be the required amount for these rooms, except for the same aforesaid corrections. In the next column note the number of radiators to be placed in each room, and in the column which follows enter the standard size of radiator to be used, as: 2 col.—32 in.

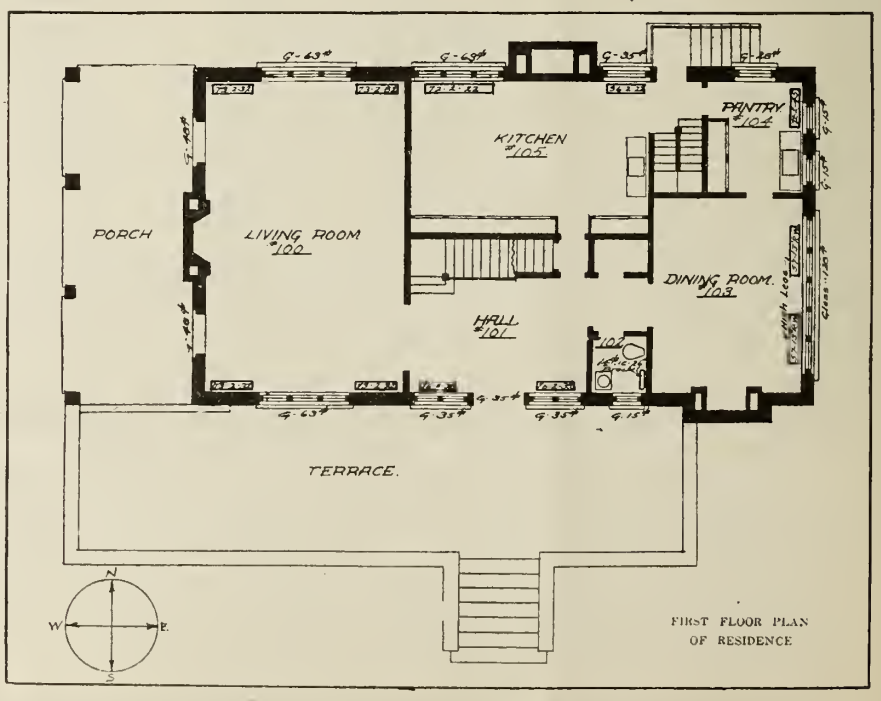
The record will now be complete except for those who wish to make the corrections for the different heights, widths, etc., of the radiators. As this has been made a very simple matter with this system, there should no longer be any excuse for omitting a much needed correction.

As was mentioned before, the values of Kr in Table IV are about correct for a 2-column radiator over 32 in. high. In Table V this value has been taken as being equal to 100 per cent. and simple percentage factors calculated for making the correction to any other height, width and class of radiator. The values of Kr quoted for the different types were taken from the results of experiments made by well known authorities and quoted in a table recently published by Geo. Stumpt, Jr.

To make the correction on the form, enter the factor in the same space as the standard size of radiator, multiply the amount as determined above by this factor and enter the final size of the radiator in the last column next to "remarks."

Often it will prove convenient to add up the sums of each of the items. This is especially true for the amount of radiation installed and that equivalent to Kr $\times$ (T3 — T1) B.t.u. per square foot per hour, as this will be the value used in proportioning the boiler and piping to the system.

Aside from possible data on a miscellaneous factor, "Remarks" affords a convenient place for the designer to record any comments he may wish to



FIRST FLOOR PLAN OF RESIDENCE

make on his calculations. It will also prove convenient for such items as complaints of too little or too much heat, etc. If systematically kept, a few of these records should do much towards determining more exact values for the 2 more difficult-to-determine uncertain factors, the heat lost by convection and the proper percentage to allow for increased exposure.

To illustrate further the use of this system, the radiation has been figured for the first floor plan shown here, and each item noted in its proper place in the form given in the Reference Tables.

The house was assumed to be in Minneapolis, Minn., where the minimum temperature to allow for is — 30 deg. F. As the room temperature is maintained at 70 deg., the temperature range (T1 — T2) is 100 deg. The system used will be gravity hot water. The basement is heated. For these conditions, the values of KRw should be selected from the 100-deg. column, Table II.

Percentage Correction Factors For Heat Transmission Coefficient Kr Radiator 2 Column - 32 in. high = 100%

Type of Heating Surface		Kr for Steam Rad-220° Room-70°	Correction Multiply by	Kr for Hot Water Rad-170° Room-70°
Standard Pipe	Inside Diameter			
Single Pipe Horiz. or Vert.	To 1"	2.66	0.62	2.36
	1" to 3½	2.46	0.67	2.19
	over 3½	2.35	0.70	2.09
Pipe Coils less than 3'-0" high	To 1"	2.56	0.64	2.28
	over 1"	2.25	0.73	1.98
Pipe Coils more than 3'-0" high	To 1"	2.25	0.73	1.96
	over 1"	1.95	0.84	1.73
Cast Iron or Steel Radiators - Reg. Centers				
32" high 38" " 45" "	1 Col.	1.74	0.94	1.55
	2 "	1.63	1.00	1.45
	3 "	1.40	1.17	1.25
	4 "	1.35	1.21	1.18
20" high 23" " 26" "	1 Col.	1.91	0.86	1.70
	2 "	1.81	0.90	1.61
	3 "	1.59	1.02	1.42
	4 "	1.48	1.10	1.32
Window Rad. 13"-18" high High Legs	6 "	1.48	1.10	1.32
C.I. Wall Radiators	3 Sec. Vert.	1.92	0.85	1.71
	3 Sec. Horiz.	2.10	0.78	1.87
	7-9 Sec. Vert.	1.70	0.96	1.51
	7-9 Sec. Horiz.	1.90	0.86	1.69

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TABLE V. CORRECTION FACTORS FOR HEAT RADIATING SURFACES

A ¾ air change is allowed in each room except the entrance hall where 2 changes are allowed. The walls are of 12-in. brick, with furring space and plaster. Double windows are used. The heating engineer must be careful of this as the factor for a single window is much greater than for a double one. Also the leakage loss will be less with double windows.

The value of KRw for these exposures are as follows: 0.0114 for a ¾ air change, 0.0304 for 2 air changes, 0.138 for the wall, and 0.346 for the glass. The ceilings and floors are not considered, as the temperature is the same on both sides. One must be careful of these, however, as it is very easy to overlook them. Occasionally a floor overhangs and is exposed outdoors. Sometimes the basements are not heated and many houses have an unheated attic.

The method of correcting the exposure and the corrections for the various widths, heights, etc., is plain in the form, and needs no further explanation.

In order that the piping to the radiators may be proportioned correctly, the amount of radiation carried on each pipe should be summed up after the correction for exposure has been made, and before the corrections have been made for the different heights, widths, etc., of radiators. That is, the sums should be taken from the column headed "Corrected Size." If this is done, each square foot of radiation at the boiler is equal to 245 B.t.u. for steam and 145 B.t.u. for hot water. After this sum has been estimated, it should be noted properly in the heading.

Fill out as completely as possible data at top of "Heating Schedule" sheet. Number the rooms consecutively and record in first column; opposite the numbers write the names of the rooms in second column. In the third column put the dimensions of the rooms—length, width and height. Columns 4, 5, 6 and 7 are respectively for the volume in cubic feet, outside wall surface in square feet, glass surface in square feet, and exposed roof surface in square feet. The multiplying factors are placed in the eighth column and are secured from Tables I or II, according to whether steam or hot water is used. In the ninth column place the radiator surface necessary to care for the different heat requirements of the room found by multiplying the value in one of the preceding columns by the factor opposite it in column 8. In column 10 is the total heating surface for the various rooms; this surface must be corrected for exposure, which is noted and factor, found in Table III, placed in column 11, and the corrected surface is given in column 12, found by multiplying the values in column 10 by the factors opposite in column 11. In the next column is the number of radiators to each room, followed, in column 14, by the standard size radiator and correction factor given in Table V. The final size of each radiator is given in column 15, and in the last column is space for remarks.

DON'TS TO PLUMBERS

Don't make a flat bend.

Don't say the plugs won't hold.

Don't cover work before inspected.

Don't forget to drift kinked pipes.

Don't instal inefficient clean-outs.

Don't try to repair a cracked fitting.

Don't omit clean-outs where required by the plumbing by-law.

Don't look for gas leaks with an open flame.

Don't place vent tees lower than the fixtures.

Don't construct work of underweight materials.

Don't call for inspection until the work is ready.

Don't use "stop and waste" on a hot water pipe.

Don't give pipes less pitch than the by-law requires.

Don't fail to comply with the requirements of your plumbing by-laws.

Don't forget to ream out burrs from wrought iron pipes.

Don't forget to make the overflow on the bathtub tight.

Don't give wrong house number when calling for inspection.

Don't forget to put in all water pipes so they will drain.

Don't fail to put up grounds for pipe and fixture supports.

Don't try to caulk a joint with a round-edged caulking iron.

Don't let the marks of the bending spring show on the bend.

Don't let your solder run through to the inside of the pipe.

Don't let the pipe protrude on the inside of a branch joint.

Don't use prohibitive fittings in drain, soil and waste pipes.

Don't put more fixtures on a line of pipe than allowed.

Don't forget that your license expires on the 31st of December.

Don't run vent lines less than four inches in diameter through roof.

Don't fai' to support properly lead work piping for its full length.

Don't refuse to show your license when such request is made.

Don't be indifferent about alignment in vertical and horizontal piping.

Don't wait until after the inspector arrives to fill pipes for testing.

Don't refuse to comply with local ordinances.

Don't construct vent pipes in such manner that they may serve as waste pipes.

Don't depend on the supply and waste pipe to hold up a sink or wash basin.

Don't forget that traps must be set true with respect to their water levels.

Don't think that the inspector will ignore the by-law because you may have done so.

Don't construct joints of material or workmanship not permitted.

Don't fail to put substantial supports where needed on drain, soil and vent pipes.

Don't be indifferent about the setting of closet bowls or similar fixtures.

Don't forget to clean up your work and the premises when your job is completed.

Don't instal a drainage system in such manner that it will contaminate drinking water supply.

Don't use any fitting on a waste pipe that will prevent the free passage of air through it.

Don't terminate soil, waste, vent and conductor pipes below windows.

Don't fail to support properly lead plumbing to your customers to acquaint them with defects that may exist in the old plumbing and drainage on the premises, for in so doing you may save yourself as well as your customer much future trouble.

Steam Traps, and How They Operate

Heating Engineers Will be Interested in This Series of Articles Which, After Describing Some of the Most Effective Radiator Traps, and the Tilt Trap, Will Deal With the Condensation Return Trap, Etc.

STEAM TRAPS—V.

THE Sarco trap is another example of the thermostatic type and is characterized by great compactness and simplicity. The interior construction is illustrated in Fig. 27, from which it will be observed that the device consists of a steam pipe body which can be screwed on anywhere in a steam main or pipe, taking the place of an elbow or bend, in the upper end of which is secured a tubular piece termed a cartridge. This cartridge is hermetically sealed both top and bottom, the top end being threaded and adjustable in the body, while the lower end is made so as to allow the valve stem to project upward inside of a spirally corrugated tube, the lower end of this tube being secured to the lower end of the cartridge. The upper end of the valve spindle is fastened to the cover which closes the upper end of the corrugated tube and the space between the cartridge tube and the corrugated tube

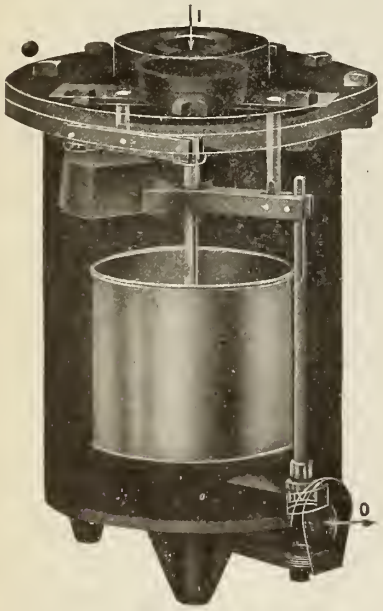


FIG. 28. KITTS STANDARD STEAM TRAP WITH SUBMERGED WEIGHT.

is filled with an expansible fluid. Under the influence of heat, this fluid expands and its increase in volume causes the corrugated tube to contract in length so that the valve spindle is moved downwards and seats the valve when the temperature reaches that of steam. When water collects and surrounds the cartridge, the reduced temperature causes the liquid to contract and allow the corrugated tube to extend upwards again, opening the valve and repeating the sequence of operations indefinitely.

This trap is made by the Sarco Engineering Co., New York, and is built in

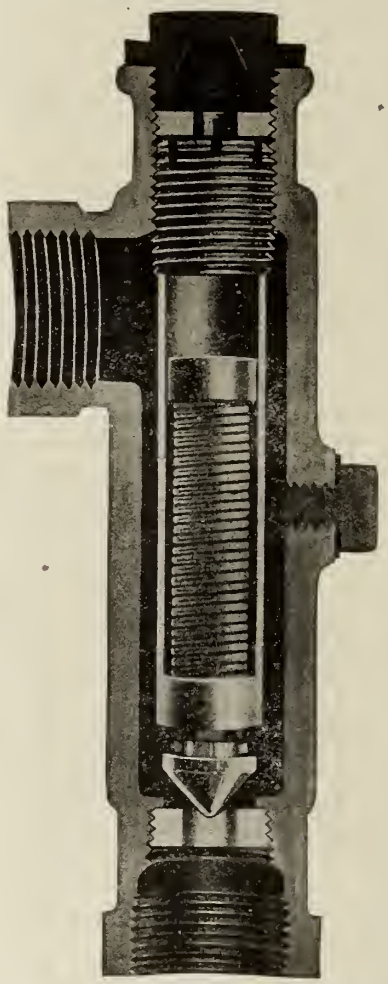


FIG. 27. SECTION OF SARCO TRAP SHOWING CARTRIDGE AND SPIRAL TUBE.

a variety of sizes suited for general work, as well as low pressure, vapor and vacuum heating systems.

Kitts Standard Steam Trap

The principle involved in the operation of this trap is that of the change in weight of a body when immersed in water. The transparent view, Fig. 28, shows the discharge valve, controlled by a weighted lever suspended from the top cover and having a very short fulcrum. The open bucket is suspended from one end of a short lever, the other end being connected by a link to the weight.

In operation, condensation falls into the sediment chamber in the top, overflows into the copper bucket and then overflows into the body of the trap. When the water level surrounding the full bucket is about half way up, the buoyant effect of the water reduces the effective weight of the water in the bucket allowing the weighted lever to fall and operate the discharge valve. When the water level has fallen a certain distance, the bucket drops again, raising the weight and closing the valve.

This trap, along with the T. C. trap, is made by the Kitts Mfg. Co., Oswego, N.Y.

T. C. Steam Trap

This trap is operated by solid weight instead of a hollow bucket, the general scheme of operation being similar to the trap already described. The discharge valve, however, is placed in the top of the body, a pipe extending down below water level to insure a water seal at all times. This arrangement enables the valve and seat to be removed for observation without breaking any pipe connections. The connecting link between the upper and lower levers, Fig. 29, is so proportioned as to form a counter-

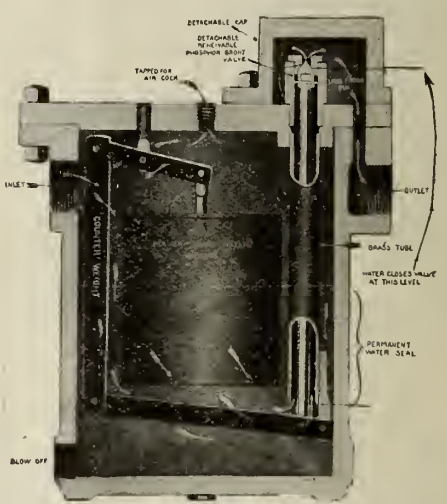


FIG. 29. T. C. STEAM TRAP WITH DISCHARGE VALVE ON TOP.

weight for the gravity weight and performs the same function as the weights in Fig. 28.

(Continued in next issue.)

Willis—"Bump has a very up-to-date office."

Gillis—"Yes. He has one of these office systems where you can find just what you want when you don't want it by looking where it wouldn't be if you did want it."

Board of Health to Approve Plans First

A Splendid Move Made by Montreal Board of Health—Plumbing, Lighting and Ventilation is Acknowledged as Matter of Health—Too Many Medical Officers of Health Desire to Shirk a Vital Duty.

FOR many years there has been a feeling among medical officers of health that the plumbing inspection department should be under either the building department or city architect. But SANITARY ENGINEER has several times shown very specifically that such a move would be retrogressive and not in the interest of the public.

The trouble appears to be that our average medical health officer is more concerned with curing the sick than with the prevention of such sickness. These medical men are, however, not the progressive ones in their own profession, because they allow any kind of a building to be built or any kind of plumbing to be installed, while, as a rule, very little, if any, thought is given to ventilation, and absolutely no provisions are demanded to furnish a given amount of humidity.

The proper lighting of buildings, whether by artificial or natural light, is a matter of health, as is proved every day by practical medical men, or, shall we say, by those men who have studied the common needs of humanity. These things must all be given more serious thought in the very near future than ever before, for the simple reason that already the jerry builder and incompetent architect are laying plans for speculative buildings and the public will suffer.

It is no exaggeration to say that at least 50 per cent. of the coal mined within the last 25 years has gone up in smoke and has done no real service, but has rather gone a long way towards generating 60 to 70 per cent. of our cases of pneumonia, and has made our towns and city much less healthy to live in.

Many men will say that all such matters can be governed by by-laws. That may be so to some extent, but it is not entirely true because of the fact that not only new work should be inspected, but also repairs to plumbing work.

This was explained in SANITARY ENGINEER March 2nd, 1914, in the following words:

"Here are a few reasons why the plumbing should not be attached to the architect's department: First, an architect could not be expected to understand every point of a plan of sanitary engineering, because there are so many conditions to be taken into consideration which would require actual practical knowledge before a proper decision could be arrived at, and such decisions can only be arrived at by men who have made sanitary engineering their study, and who have actually installed such engineering work. Second, the plumbing department has not only to keep an eye over the new work which is being installed, but has also to inspect old work and installations which have become unsanitary. For instance, the health department traces some cases of illness. They send an inspector of sanitary engineering and he passes judgment on the sanitary engineering, stating to what extent it is, or is not, defective, and after seeing that defects, if any, are rectified, he reports to the health department that all is now OK, and there the matter ends.

"But in the event of the architect's department taking over the jurisdiction of the plumbing, then, in case the health department finds the plumbing in not too good a state, its official must report to the architect's office and the head of that department will then have to consult another official under him, who, of course, will be a plumbing inspector. This latter official will have to report to the health officer, so it can easily be seen that such a roundabout way would not only prove to be inconvenient, but also would lack efficiency. The plumbing department is nothing more or less than the engineering part of the health department, and should by all means be amalgamated with that department, if with any.

"Further, as we stated before, the plumbing, or sanitary engineering, which is required even in a single residence is becoming more than ordinary work; it is becoming more complicated, and requires more than ordinary skill to instal. The public are beginning to value the work of sanitary engineers more than ever; they are finding that first-class plumbing is the cheapest in the end; they are demanding more efficiency than ever from the craft, and it cannot be expected than an architect should be able to keep strides and be a professional in his own line, as well as in those lines involved in the everyday accomplishments of the sanitary engineer."

It is, however, very encouraging to find that at least one city in Canada has decided that all that portion of engineering that has a bearing upon the health of the people is to come under the jurisdiction of the health department. Here we find that every department head endorses this most practical move, which goes to prove that the architect, the health officer, city attorney, and the Board of Control, too, must have given the matter much serious thought.

It is encouraging, too, to SANITARY ENGINEER that, in accordance with its contention made as far back as 1914, the sanitary engineering department be placed first in such matters as seeing to it that buildings are practically under

(Continued on page 28)

CHANGE METHOD OF BUILDING INSPECTION

Subject to the approval of the Law Department, the Board of Control has passed a resolution providing that the sanitary inspector of the Board of Health must approve of all building plans submitted to the Building Inspection Department. Particular attention will be paid to the lighting and inspection of buildings. The resolution comprised the text of a joint report by Inspector Chausse and Dr. Boucher, as follows:

"Resolved, that in all cases when it is proposed to erect or repair, or modify a building, the plans and specifications, or if there are no plans and specifications, the application for a building permit containing a description of the work, must be filed by the builders in the building inspector's department. The plans and specifications or the applications containing the information, as the case may be, are to be transmitted by the building inspector to the Board of Health, for examination by the sanitary engineer, in conformity with the city by-laws.

"The sanitary engineer, after examining the said documents, must return them to the building department in three days after receiving them, with a note indicating that he approves or refuses the permit applied for. If he refuses he must state in writing his reasons.

"When builders make an application for a permit to make one or more changes in the execution of a project which has been approved, the application must be made to the building inspector's department, which will submit it to the sanitary engineer of the Health Department, for what concerns him, and the latter is to approve or refuse according to the city by-law, the permit or refusal to be in writing.

"The inspection of works in the course of execution, or after their completion, is to be made by the inspectors of the building inspector's department. When the work is completed notice must be given by the building inspector's department to the sanitary engineer that the final inspection of the work has been made, and that the construction is in conformity with the plans and specifications or with the description or record. The present resolution is to be submitted for approval to the law department."

MUST APPROVE PERMIT.

At its meeting yesterday the Board of Control decided that henceforth building permits, before being granted, will have to be submitted for inspection and approval to the sanitary engineer of the Board of Health. The City Attorney, the City Architect and the Medical Health Officer strongly endorse this decision. The Sanitary Engineer, in examining the plans, will see that all provisions as to ventilation, light, situation, area of floor space, etc., be observed.

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

WEAKNESS in the market for pig lead has caused an important change in the downward direction on lead pipe and lead waste pipe. There has been a marked decline in the primary market for pig lead during the past two weeks and the bottom seems not to have been reached. This condition has an important bearing on solder, lead sheets and other products manufactured wholly or in part from pig lead. Brass and copper are holding in fairly steady market. In some quarters, however, higher prices were recorded on brass steam cocks. Demand on these products is reported still good.

Range boilers are holding steady at the advances recorded in last issue. The embargo recently put into effect by the United States Government on heavy steel sheets has had the effect of shutting off additional supplies for their manufacture. However, manufacturers who are able to show that their goods are being used for military purposes stand a good chance of being permitted to bring supplies of raw materials into Canada.

Wrought iron pipe in the larger sizes is very hard to obtain, available stocks of 4-inch and larger being very low. Mills usually engaged on rolling materials for the large pipe are now turning their attention to manufacture of plates for shipbuilding at the behest of the United States Government. Manufacturers of valves report a continued heavy demand, while other plumbing lines are for the most part in quiet demand.

TORONTO, Oct. 29.—While price changes have not been numerous during the interval since last issue there have been important developments in commodities that have their bearing on the plumbing trade. With an embargo on heavy steel plates and greatly reduced prices in the primary market for pig lead, interesting developments have taken place in some directions. Declines in lead products have been recorded, which will come as welcome news to the plumbing trade. Undoubtedly high prices are restricting the use of many materials and with a return to somewhere near normal conditions would perhaps herald the time when a resumption of building would again come about. Building activity remains at a minimum with the approach of the winter season. A certain amount is being done in the nature of repair work and in the finishing of structures that have been under way for some time.

Range Boilers Hold At Recent Advance

RANGE BOILERS.—There has been a continuation of the firm situation in range boilers during the past fortnight. The possibility that manufacturers would not be able to get additional supplies of the particular kind of steel plates used in their manufacture put an element of uncertainty in the market. However, recent arrivals of stock that had been on order for some time placed manufacturers in fairly good shape for at least two months into the future. There is a possibility, furthermore, that since range boilers have been used extensively in munition plants and camps that supplies of these plates may be allowed to come forward on license. Prices, while in a firm position, remained unchanged at the advances recorded in last issue on the 35-gallon and 40-gallon sizes.

	Standard	Extra Heavy
30-gallon range boilers....	$13.00	$17.00
35-gallon	17.00	20.50
40-gallon	20.50	24.00
52-gallon	28.00	32.00

Larger Sizes Of Pipe Hard To Obtain

WROUGHT PIPE. — Manufacturers are still unable to get supplies of raw materials for the manufacture of the larger sizes of steel pipe. This applies to pipe of 4-inch and heavier. The particular kind of steel used in this class of pipe is now being utilized in plates for shipbuilding. Stocks of these larger sizes of pipe are hard to obtain as they are steadily dwindling. There is a fair demand for the smaller sizes and prices remain unchanged at the list of July 5, 1917.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917.

Standard Buttweld.

	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 5 00	$ 6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld.		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES.

4" and under, 45%.
4" and under, running thread, 25%.
4½" and larger, 40%.

STANDARD COUPLINGS.

4" and under, 35%.
4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces.

Enamelware Trade Is Somewhat Quiet

ENAMELWARE.—Trade in enamelware is somewhat quiet at present owing to the lightness of building operations. New buildings are not being undertaken at the present time owing to the approach of winter and purchases have already been made for buildings that are now being completed. Where deliveries for these new buildings have not been made they are being shipped as required. Prices remained unchanged at recent quotations.

Bath-tubs, roll rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bath-tubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple.....	16 80
Closets, oak tank and seat	22 00
Do., enamel iron or white vitro tank...	23 75

Soil Pipe And Fittings Hold Steady

SOIL PIPE, FITTINGS.—The market for soil pipe and fittings remained unchanged at recent quotations. There is a fair demand reported. Manufacturers experience difficulty in getting their supplies of raw materials but are endeavoring to make the best of the situation.

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	....	15%
Cast elbows, tees, etc.	....	15%
Plugs	....	30%
Bushings	30%	33%
Flange unions, standard	....	20%
Dart unions, ¼-inch to 2-inch	20%	25%
Do., 4½ in. and larger	....	15%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4-in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.	0 50	0 63
Do., Class B, lb. net	0 22	0 33
Do., Class C, lb. net	0 15	0 22

Brass Steam Cocks Register An Advance

VALVES.—In certain quarters an advance of approximately 10 per cent. was recorded in the price of brass steam cocks. Where standard grade was formerly quoted at a discount of 10 per cent. off list they are now quoted at net list. In other lines there has been no change, prices holding steady at figures given in last issue. Continued good demand is reported.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard.	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	Net
Globe, angle and check valves, standard.	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Plumbers' Oakum Still Holds Steady

OAKUM.—A steady condition prevailed in the market for plumbers' spun oakum in the face of advances recently made in other grades of oakum. Demand for this commodity is only fair and with the winter season approaching will probably be lighter still. Lightness of demand is a factor that is tending to keep prices steady.

		Per 100 lbs.
Best American	....	$21.50
U.S. Navy unspun	....	20.75
Plumbers' spun	$8.50	10.00

Lead Pipe And Lead Waste Pipe Down

LEAD AND ZINC PRODUCTS. — Owing to the rapid decline in the price of pig lead during the week there have been further declines in lead pipe and lead waste pipe of 1c per pound. Lead pipe is now quoted at 16c and lead waste pipe at 17c per pound. Other lead products are in weaker tone owing to the primary situation in pig lead.

Lead pipe, lb.	$ 0 17	....
Lead waste pipe, lb.	0 18	....
Lead traps and bends	20% on list	
Lead wool, lb.	0 15¼	0 17
Lead, caulking, lb.	0 13½	....
Lead sheets, 3 lbs. sq. ft.	0 15½	0 16¼
Lead sheets, 3½ lbs. sq. ft.	0 15½	0 16¼
Lead sheets, 4 to 6 lbs. sq. ft.	0 14¾	0 15½
Cut sheets, ¾c lb. extra and cut sheets to size. 1c lb. extra.		
Solder, guaranteed, lb.	0 37½	0 40
Solder, strictly, lb.	0 35	0 38
Solder, commercial, lb.	0 36	0 38½
Solder, wiping, lb.	0 34	0 35
Solder, wire, lb.	....	0 41
Zinch sheets, per lb.	0 26	....

Black Sheets Down 50c To $1 On Some Gauges

SHEETS, PLATES.—Declines of 50c to $1 per hundred pounds have been recorded on certain gauges of black sheets. One firm formerly quoting No. 28 gauge at $10 per hundred has announced a price at $9. This same concern has made changes on other gauges as follows: No. 29 gauge, $9.10 per hundred pounds; No. 26, $8.90; Nos. 22-24, $8.85; No. 18-20, $8.80 per hundred pounds. Another concern formerly quoting No. 28 gauge at $11 per hundred is now quoting at $10.50; No. 26 gauge, $10.40; Nos. 22-24, $10.35; Nos. 18-20, $10.30; No. 16 gauge, $11.25; No. 14, $11.15 per hundred pounds. Galvanized sheets held in steady position except for the fact that lower quotations of last week are now more generally being quoted. Black sheets are in fairly good supply due to recent arrivals. On plate the market is about cleaned up, 3-16-inch and ¼-inch plate being practically unobtainable.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$....	$12 00
12 gauge	10 05	11 00
14 gauge	9 95	11 15
16 gauge	10 00	11 25
18-20 gauge	8 80	10 30
22-24 gauge	8 85	10 35
26 gauge	8 90	10 40
28 gauge	9 00	10 50
29 gauge	9 10	....
3-16 inch plate	....	....
¼-inch boiler plate	....	13 00
GALVANIZED SHEETS—	**Per 100 lbs.**	
10¾ oz.	11 25	12 00
U.S. 28	10 95	11 70
U.S. 26	10 65	11 40
22 and 24	10 50	11 25
18 and 20	10 35	11 10
16	10 20	10 95
14	10 10	10 85

Modification Of Government Control

BOILER TUBES.—Dealers in boiler tubes in elaborating on the extent of control of the Government over supplies of boiler tubes amplified the statement of last week by stating that it is only supplies to these goods which have been brought into the country since September 20 which the Government can commandeer if required. It is stated that stocks previously in the country can still be sold to the domestic trade under certain restrictions. There is no improvement in the situation with respect to arrivals and prices have held at firm levels.

	Per 100 feet	
Toronto—	Cold drawn	Lapweld
1 inch	$36 00	$ ....
1¼ inch	40 00	....
1½ inch	43 00	36 00
1¾ inch	43 00	36 00
2 inch	50 00	36 00
2¼ inch	53 00	38 50
2½ inch	55 00	42 00
3 inch	64 00	50 00
3¼ inch	....	58 00
3½ inch	77 00	60 00
4 inch	90 00	75 00

Conductor Pipe And Eavetrough Going Well

CORRUGATED SHEETS, CONDUCTOR PIPE.—Manufacturers of conductor pipe and eavetrough report that repair work has occasioned a fairly good demand for these commodities within the past few weeks. Corrugated sheets, however, are in rather light demand. Nothing definite has been learned as yet with respect to the new prices on the sheets affecting this particular commodity and dealers have shown no disposition to change prices. Eavetrough and conductor pipe are being quoted at 10 per cent. off list.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7.20
No. 26 gauge	9.60-10.00	....

Old Materials Again Marking Time

OLD MATERIAL.—There was inactivity in the old material market during the week and prices held without change. Mills are not in a buying mood at present and collectors show a disposition to hold their wares until something more definite turns up in the market.

Tea lead	$ 0 06½	....
Heavy lead pipe	0 08¼	....
Yellow brass	0 13	0 14
Red brass	0 20	....
Light brass	0 09½	0 10
Heavy zinc	0 06	0 06¼
Heavy copper	0 20	0 21
Stove plate, per ton	17 00	18 00
Old rubber boots and shoes	....	0 08¼
Old cast iron, per ton	23 50	25 00
Overshoes, trimmed Arctics	....	0 06¼
Auto tires	....	0 05¾
Bicycle tires	0 03½	....
	Per gross ton	
No. 1 railroad wrought	....	22 00
No. 2 railroad wrought	9 50	10 00
Pipes and flues	....	12 00
No. 1 busheling	16 00	17 00
No. 2 busheling	....	12 00
Country mixed scrap	14 00	15 00
Country No. 1 wrought iron	....	18 00

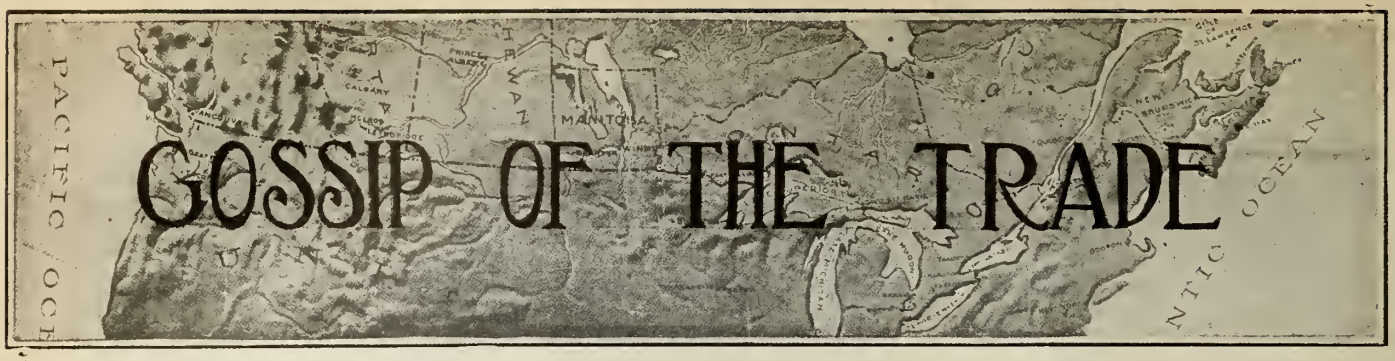
Lead Goes To Still Lower Levels

INGOT METALS. — The feature of the week has been the decline in the pig lead market both in primary markets and in local market. Pig lead prices are now just half what they were six months ago. Owing to the unsettled condition in the market buying has not been active.

COPPER.—With unsettled conditions in the producing fields where strikes have been in progress and a return to work reported, conditions in the copper market generally have been in an uncertain condition for some time. Locally there has been a fair demand with prices for casting copper 32c per pound and electrolytic at 33c per pound.

TIN.—Spot tin in the primary market at New York was very scarce during the week but London market declined 15s. on Straits tin. It is understood that

(Continued on page 30)



OBITUARY

G. Alsip, of Alsip Brick and Tile Company, Fort William, Ont., is dead.

TO ESTABLISH CANADIAN FACTORY

J. R. Dulany, the vice-president and general manager of the Chamberlain Company, manufacturing chemists, was in Toronto during the week of Oct. 15, making arrangements in connection with establishing a Canadian factory in Toronto.

We understand that Mr. Dulany placed several orders with several concerns for material, etc., with a view of having things in readiness for early shipments to the Canadian trade at no very distant date. One of the big lines manufactured by this concern is a pipe cleanser known as "Desolvo."

ASBESTOS PRODUCTION IN CANADA

The production of asbestos in Canada during 1916 and the first half of 1917, according to returns received by the Mines Branch, Department of Mines, Ottawa, is shown: Total sales and shipments amounted to 73,203 tons for the first six months of 1917, valued at $3,091,575, while the whole number of shipments for 1916 were 154,149 tons, with a value of $5,228,869. The value of asbestos exported in 1916 was $4,133,735, while for the asbestos exported during the first half of the current year $2,465,957 was received. Imports in the way of manufactured asbestos during 1916 amounted to $334,670, while the imports for the first six months of 1917 have amounted to $287,056.

ABOUT ALUMINUM OXIDE

Oxide of aluminum is so nearly of the same specific gravity as the metal that it does not allow the molten metal to clear itself when in small globules or grains. For this reason mechanical aid has to be given. In practice the scrap is so far heated in the crucible that it becomes a pasty mass, in which state it is squeezed and kneaded for some time preferably with an oak or other hardwood rod of fair cross area, and then the heat is raised, and with some manipulation of the rod the metal is cleared of the dross and dirt. If melted rapidly, a dirty mass of metal and oxide is produced with a heavy loss of actual metal held in the skimmings from which it cannot dissociate itself, owing to its slight weight.

PLUMBING DIVISION

Permits issued: 74

Inspections

Water Tests	Smoke Tests	Subsequent Inspections	Miscellaneous Inspections	Defects Rectified
55	110	329	20	230

Sewer Division

Permits issued	Connections constructed	Inspections
13	13	110

Flushings

Tank Flushings Gallons	Hose Flushings Gallons	Total Gallons of Water
1,046,016	678,750	1,724,766

The above table shows the work accomplished by the Winnipeg Plumbing and Sewer Inspection Department during the month of September—a public service that cannot but be of inestimable value to the citizens of Winnipeg.

Toronto Society Monthly Meeting

The Meeting Was Well Attended, and Every One Present Enjoyed the Various Topics Discussed—Secretary Frankland Read a Paper on Overhead Expenses—Edwin Newsome, Editor Sanitary Engineer, Gave an Address on Wrought Iron Pipe Versus Cast Iron For Plumbing Construction.

On Wednesday, October 17, 1917, the Toronto Society of Domestic Sanitary and Heating Engineers held their regular meeting in the Canadian Forester's Hall, 22 College St.

President Fred. H. Gentle presided and called the meeting to order at 8.15 p.m., a large and enthusiastic meeting being held, and the following items being acted upon:

It was decided to forward parcels of comforts to the members overseas to the value of five dollars each, six of the members participating as follows:

Sergeant Harry Ruddick, No. 843, 1st Canadian Machine Gun Co., 1st Canadian Division, British Expeditionary Forces, France; Corporal Harry Griffiths, No. 317049, 13th Battery, Canadian Field Artillery, Canadian Expeditionary Force, France; Corporal George Kirtley, No. 778107, B. Company, Canadian Engineers Training Depot, Shoreham Camp, Sussex, England; Private A. E. Crowne, No. 249643, 208th Batt., D. Co., C.E.F., Army Post Office, London; Capt. G. A. Keith, 124th Batt., Canadian Expeditionary Forces; France; Major D. F. Keith, 75th Battalion, Canadian Expeditionary Force, France; the matter being left to Secretary Frankland for attention.

A donation of twenty-five dollars was made to the British Red Cross Fund, 1917 campaign.

The members decided to pay a visit to the Buffalo Master Plumbers' Association during November, a special car being arranged for, and Secretary Frankland to register those that are going, and to arrange details.

A special committee of five, composed of Messrs. D. Maclulich, accountant at Keiths; Mr. Thompson, accountant at Bennett & Wright Co.; Fred Lucas, secretary-treasurer, Purdy Mansell; Thomas Entwhistle, accountant of F. R. Maxwell & Co., and Kennith B. Allison, secretary of North-enders, were appointed to meet and confer with Mr. C. D. Henderson, Brantford, in reference to the charges made for material in the Henderson business service.

The question of public comfort stations was taken up at some length, and the international public comfort station mark, as adopted by the American Sani-

tary Engineers' Society, and used throughout the United States on all places where such accommodation is provided for the public, as for instance garages, stores, service stations for the automobilists, and public parks and buildings, was referred to the executive committee to outline necessary action for a publicity campaign to be carried out throughout Canada.

Mr. J. H. Gowan's name was presented to the meeting as a proposed member and favorably acted upon.

Secretary Frankland gave a talk on overhead expenses as experienced in the plumbing and heating business, being the first of a series of half-hour talks to be given at the monthly meetings on this most important of subjects.

President Gentle introduced Mr. Edwin Newsome, editor of SANITARY ENGINEER, who addressed the members on wrought iron pipe vs. cast iron pipe for plumbing installations. Mr. Newsome handled this most complex subject without gloves, giving facts and figures that overwhelmingly convinced all present of the vast superiority of cast iron pipe over wrought iron pipe for plumbing construction. That the intended installation of wrought iron pipe for the plumbing work in the Parliament Buildings at Ottawa was not in the best interests of the welfare of our country, let alone the lives of our representatives who will have to subject themselves to the use of same, was agreed to by all present, when Mr. Newsome placed the statistics already secured on faulty wrought iron pipe plumbing installations before the members.

The general composition of wrought iron pipe, its mode of manufacture and the resultant action that befalls it were all convincingly laid before the members, so that no doubt remains in their minds but that cast iron pipe is the superior material of the two to be used in plumbing drainage waste and vent work.

A hearty vote of thanks was accorded to Mr. Newsome by President Gentle on behalf of the members of the Toronto Society of Domestic Sanitary and Heating Engineers, for his most able and instructive address.

Mr. Newsome in reply stated that it afforded him much pleasure to be present among the craft, as he hoped they had pleasure in listening to his address, and assuring the members that he would be pleased to favor them at some later date with another address, if they so wished.

Secretary Frankland reminded the members that Mr. Newsome had always done his utmost in behalf of the craft and its welfare, that the pages of his valuable journal, the SANITARY ENGINEER, were always at the back of the trade, and it only required the members to show their appreciation of what was being done for them through its columns, to subscribe for same and keep their subscription always paid up to date.

The meeting adjourned at 11 p.m., and brought to a close one of the best and most progressive meetings that the Toronto society have ever held.

ADDRESS WILL BE PUBLISHED IN NEXT ISSUE

At the request of quite a number of persons present it is our intention to publish the address in full in the next issue of SANITARY ENGINEER.

REDUCING VALVES

Bulletin issued by Chaplin-Fulton Mfg. Co., Pittsburg, Pa., describes the "Fulton" steam reducing valve, and also gives directions for setting and operating this device. Two types are illustrated together with prices for the various sizes.

LETTERS TO THE EDITOR

SANITARY ENGINEER'S stand is fully endorsed regarding the controversy now being carried on as to the proper kind of pipe that should be used for soil waste and drainage purposes —wrought iron or cast iron?

Editor SANITARY ENGINEER,
143-53 University Ave.,
Toronto, Ont.

Your letter of the 17th with a copy of the Financial Post of Canada received. The criticism of the specifications for the plumbing in the new Parliament Buildings is extremely interesting. It certainly is a mistake to specify the use of wrought or mild steel pipe whether it be galvanized or otherwise for soil, waste, and vent pipe purposes in the light of the experience of those who have to do with plumbing installation.

Wrought iron or steel pipe has a very large field open to its use and it also has a large field closed against its use on account of its inherent qualities. That such pipe is subject to corrosion is evident and an accepted fact among men of intelligence. A thin galvanized coating, which is nothing but a very thin coating of zinc over iron, affords a certain amount of protection against rapid corrosion. Anyone with even a small knowledge of the rudimentary facts in chemistry knows that zinc is very readily attacked and destroyed by the action of certain acids when brought in contact therewith. If one will but use a very much diluted solution of hydrochloric acid on a piece of zinc, or even on galvanized pipe, they will see very readily what takes place. The acid speedily consumes the zinc. In practical use galvanized pipe for plumbing systems, namely, soil, waste and vent pipe purposes, is brought into close contact with acids which are occasionally thrown away as waste.

It has been demonstrated that gases given off by wastes which are discharged into soil and waste pipes when brought in contact with moisture produce acids. These acids are responsible for the rapid corrosion of mild steel or wrought iron pipe and we know that even galvanized affords but a very meagre amount of protection.

The frequent occurrence of leaks in the plumbing systems in some of our modern buildings has effectually demonstrated how unwise it is to use such pipe in plumbing systems, as has been pointed out, I believe, by yourself. One of the most flagrant examples brought to my immediate attention was that in the Borland Building in this city about two years ago. In making connections between installations made in their newer section of that building to an existing soil and waste pipe system which had been put in the original building about ten years before, it was found that soil and waste pipes were practically destroyed and the vent pipe entirely disintegrated near the flourth floor level by corrosion. The vent pipe in this case was galvanized mild steel. The soil and waste pipes were tar coated mild steel pipe.

It is a well known fact that a great quantity of strong solutions of caustic soda and other strong cleaning compounds are used in the cleaning of office buildings. The point of greatest mist density in a building of that character is between the third and fourth floor levels. This, I believe, accounts for the disintegration at that point of the vent pipe.

Now experience also has shown that cast iron pipe will withstand the action of such destroying agencies much better than will wrought iron or steel pipe. It is also perfectly practicable to use it wherever the screw pipe can be used, and aside from prejudice there seems to be no other reason why it should not be more generally used in plumbing systems.

It may be said in passing that very few plumbers know how to properly caulk a joint in cast iron pipe. Possibly that is one reason why there has been prejudice against its use, where it would be subject to considerable pressure in making tests. The matter of cost seems to have been thoroughly covered in the criticism in your paper. Experiences such as this may be repeated ad infinitum.

Very truly yours,

(Signed) THOS. J. CLAFFY,
Asst. Chief Plumbing Inspector,
Chicago Health Dept.



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

Some Timely Septic Tank Questions

Editor SANITARY ENGINEER.—I read with interest your timely article on sewage systems for country homes in this month's current issue, and would like to ask the following questions in regard to same:

1st. How long has the system to be installed before the bacterial action takes place?

I am asking this question, as I have two systems to instal this coming month (which is just before freeze up), and I am afraid they will freeze up before they are in full working order.

2nd. How far is it feasible to extend the disposal field from the tank (the latter being close up to the house)?

3rd. Would it be a good plan to place the breather pipe half-way between tank and field, as, in the case of a blow-down, the breather being placed close to the tank, might cause some annoyance?

W. S. W., Alberta.

Replying to above questions in the order given:—

1st. There would be no harm in installing the tank providing you dig the earth out about one foot around the outside of the tank and pack it well with good manure; then cover the manure with about a foot of clayey loam and pack down.

This will keep the tank and contents warm. The temperature at which bacteria will cultivate best is around 65 degrees, and to take an extra precaution that there is not too much water used where it can be conserved, we would recommend that you set the w.c. ball cock so as to only flush about 2 to 2½ gallons of water at one time, and instruct the occupants of the house to use as much lukewarm water as they can for, say, about two months.

Make the cover of the septic tank watertight and put a covering of manure over it too.

2nd. There is no limit as to length of pipe from tank to disposal bed except that you would have to cover over the pipe with a good layer of manure to keep them warm—that is, the tile pipe that has no laterals connected to it.

3rd. No, do not have the breather more than two or three feet from the tank; but for the winter it would be advisable to put a box round the breather and make holes in it with an auger; fill over top of breather with loose manure and place box over the two; then as soon as the bacteria have become thoroughly cultivated there will be no odor at all.

I would advise you to place the soil pipe terminal on roof of house in as protected a position as possible.

If there is ever found to be any odor from a breather near the septic tank, it is a certain proof that the tank is not working properly, because sewer air is sweet, but obnoxious air from sewers or sewage is a sure indication that there are anaerobic bacteria present, and in a septic tank these are supposed to cultivate, and finally die before they reach the syphon chamber. The dead germs go to the bottom of the tank and are carried into the syphon chamber through the pipe that is usually placed in the division.—Editor.

HOTELMEN ARE PUBLIC BENEFACTORS

The Toronto city fathers at last appear to realize that Toronto hotelmen have made Toronto a better place to live in, not by the sale of the wares they used to deal in, but rather by the service they gave and are still giving to the public of Toronto.

For many years SANITARY ENGINEER has been advocating that a number of public comfort stattions be erected in our cities, but apparently all to no avail. It would, however, appear that if council men and members of our city boards of control will once realize that hotelmen, with their lavatory and toilet accommodation, are a necessity, and are therefore, justified in asking for a rebate on taxes, more public comfort stations will soon be granted to the people.

The following newspaper clipping from the *Toronto Star* will no doubt be of interest to many readers of SANITARY ENGINEER:

Hotelmen Give City Free Service

The deputation of hotelkeepers headed by Frank Dissette, president of the Toronto Hotelkeepers' Association, wanted the board to grant the hotelkeepers an exemption on their real estate because of the falling off of business owing to the Ontario Temperance Act.

Mr. Dissette—"I want to impress you with the fact that hotels require a rebate in order to remain in business."

Mr. Disette read a statement showing what he claimed to be the amount of money that was spent by the hotelkeepers in giving the public accommodation from which there was no revenue return. The following amounts were named: $435 for toilet articles, $720 attendant's wages, $505 water rates, $380 plumbing repairs, $275 linen toweling, $250 stationery, $4,834 light and fuel; a total of $7,300.

We are quite in sympathy with the hotelmen in so far as agreeing that they should be paid for services rendered to the public; no matter where the hotel happens to be—Toronto or any other city; but is it right that we, the general public, should have to frequent hotels or any other building that is private property, when such a service is necessary to our health and well-being, and should be provided by the municipalities?

BOARD OF HEATH TO APPROVE PLANS

(Continued from page 23.)

the final jurisdiction of the engineering branch of the Board of Health in Montreal, this has now been done.

Every health department in Canada would do well to think much more seriously on these problems before shirking a duty such as, by its very nature, properly belongs to their department.

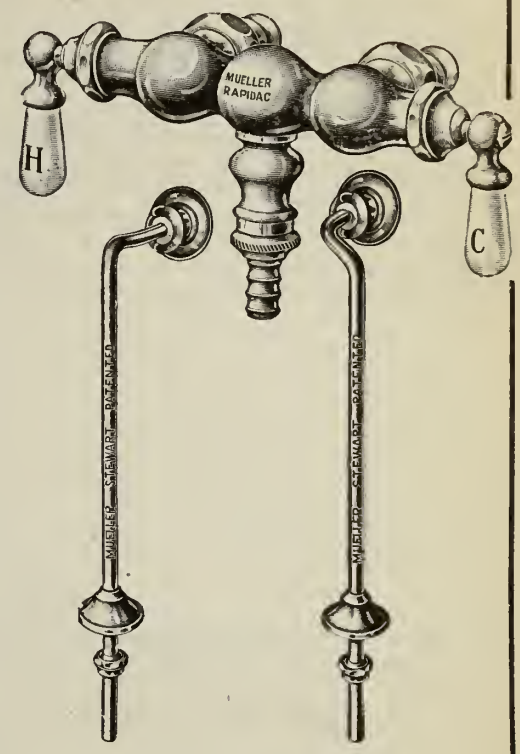
The medical men know what would fill the requirements necessary to be embodied in the buildings erected, and sanitary, heating and ventilating engineers can co-operate, and are only too willing so to do, with the medical men in every instance.

Quality makes the most Sales

In nine cases out of ten it's quality that closes the sale of plumbing fixtures. You discuss price, and terms, and how long it's going to take to complete the installation—but finally you come back to quality. It's what you are able to tell of the quality of your goods that holds the interest of your prospect and finally leads him to buy.

When you "talk quality" on a "Mueller Rapidac" Fixture you have a perfectly made, beautifully finished object that compels belief in the truth of your claims. Your prospect can see for himself that unusual care has been taken in its manufacture, consequently he will the more readily believe what you say about the things he can't see.

And then, when the sale is made, and the installation completed, there's a fixture that for years speaks volumes for your business integrity and ability.



Fuller in Design
Compression in Action

It's a
MUELLER
Rapidac

H. Mueller Mfg. Company, Limited

SARNIA :: :: ONTARIO

Makers of High-Grade Water, Plumbing and Gas Brass Goods and Jobbers of General Plumbing Supplies

PRACTICAL SHEET METAL WORK

(Continued from page 17)

ter than an apology for a humidifier, and further, 90 per cent. of them are allowed to become dry.

Speaking to a householder some time ago about keeping the water pan full, he replied that he had tried both keeping the pan full and allowing it to become dry before he refilled it, and did not find a great deal of difference. This is a fact, and proves the inadequacy of the common water pan.

In plate 21, several methods are shown by which a greater quantity of moisture may be supplied than usual. Fig. 1 shows a cast iron tray in which a number of fire bricks are placed. A large funnel containing crushed coke is provided, into which water is allowed to drop. A quarter-inch galvanized pipe and a small pin valve and elbow are fitted up as shown; a ½-inch pipe is placed about half an inch from the top of the pan to act as an overflow pipe, and by watching this overflow the pin valve above may be adjusted.

Fig. 2 shows a pan which should be about three times the size of a usual one, into which is placed a large fireclay slab, at least two-thirds of which should be projecting up out of the water. This fireclay slab is simply to increase the vaporizing of the water, thus increasing the humidity.

Fig. 3 is an appliance made up of two water pans—one deep and narrow, with a big surface exposed to the interior of the furnace; the other pan or tank is fitted with a two-ball automatic valve; the water is allowed to lower about half way down the tank before the valve operates; it then fills up both tanks. The common method with the single ball cock valve has proved a failure because the slow evaporating of the water simply caused a steady flow, thus operating in a similar manner as would a leaking ball cock: then the seat became pitted and would not turn off.

Fig. 4 shows a large ring pan suspended all round the inside of the furnace casing. The water is furnished by a dropping or pin valve. Quarter-inch pipe is used, with a ½-inch overflow. The dropping is regulated according to the amount of water being evaporated, which can be seen by the amount of overflow.

(Continued in next issue.)

MARKET CONDITION AND TENDENCIES

(Continued from page 25)

quantities of tin are held up awaiting granting of permits to be shipped. Locally prices held unchanged at 63½c to 65c per pound.

SPELTER.—There was a quiet market for spelter during the week but a better inquiry was noted on the part of consumers in the primary market. Locally prices held slightly higher at 10c to 10½c per pound.

LEAD.—Lead is in weaker tone during the week with declines recorded locally due to a big sag in the primary market within recent weeks. The Trust price in New York is quoted at 6.25c with intimation that a still further reduction is a possibility. In the local market quotations were down to 9c to 9½c pound.

ANTIMONY. — There is very little activity in the antimony market. In the primary market, there are plenty of sellers but no buyers. Locally prices were unchanged at 18c per pound.

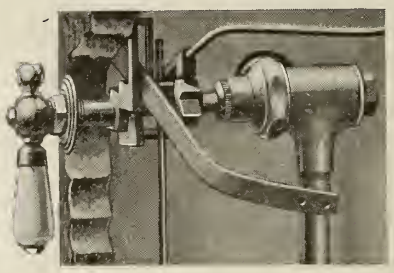
ALUMINUM.—Demand on aluminum is light with prices unchanged at 60c per pound.

PIG IRON.—Prices of domestic pig iron remain firm and unchanged with no indication of lower prices until the furnaces have disposed of a considerable portion of orders already booked. Under the present conditions prices are purely nominal.

OFF HUNTING

Wm. Mansell of the firm of Purdy, Mansell & Co., and a number of the old guard, including Lewis Legrow of Toronto, and Fred Smith of Guelph, have gone up into the Muskoka district on a hunting trip.

This is of course an annual event, though we have learned that the boys expect to contribute somewhat more to the reduction of the butcher bill this time than in days gone by. We hope they will have a good time and return not empty-handed.



TRADE SILENTFILL MARK

Water Closet Combinations Without Ballcocks— No Noise

MANUFACTURED BY

CALLOW & PHILLIPS

40-42 Lombard St., Toronto, Can.

Telephone Main 2016

3 BIG REASONS WHY YOU NEED

PURO

(MADE IN CANADA)

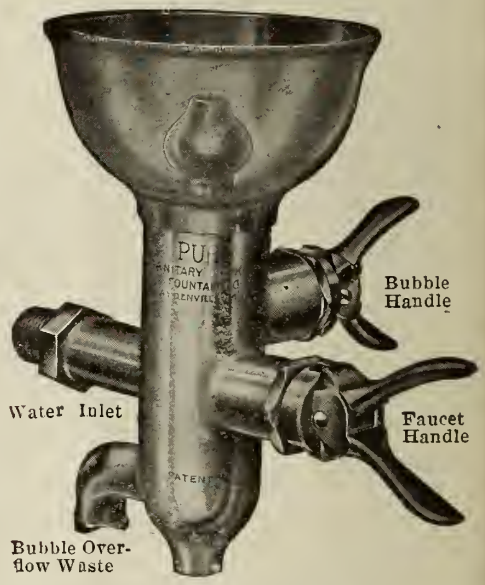
1. Puro Sanitary Drinking Fountains will give you a *better* water supply *cheaper.*
2. Puro will cut your water bills 15% to 35%.
3. PURO will safeguard the health of your employes and raise the standard of efficiency.

Are not these reasons enough? Then why hesitate longer?
PURO equipment is not expensive—the first cost is *low* and the up-keep *nothing.* Easily attached; positively fool-proof. Let us make you a special proposition for a try-out in one of your departments. Write us now—to-day—giving us the number of men; an inquiry will cost you nothing.

"PURO-FY" YOUR WATER SUPPLY

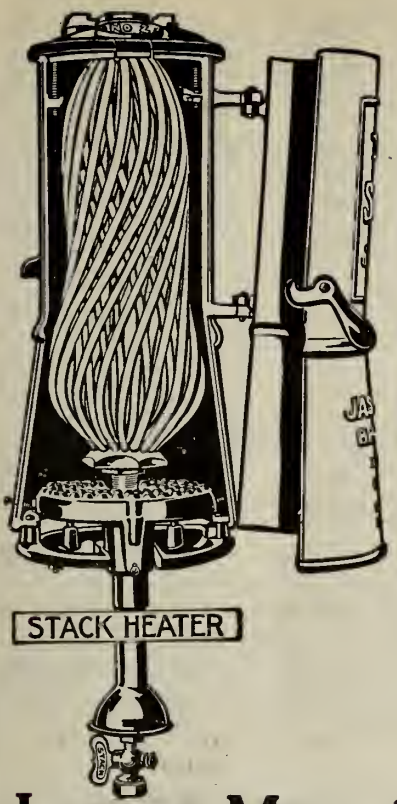
Puro Sanitary Drinking Fountain Company

143 University Ave.
TORONTO, CANADA



Arthur Larin who has had a wide experience in the plumbing trade in Montreal, has commenced business for himself as a plumber, tinsmith, hot-water and steam fitter, etc., at 58 St. Lawrence Road, Cartierville, P.Q., and has the interest and encouragement of his former employer, Mr. Gardner, in his start on his own.

Hamilton, Ont.—The City Council is purchasing additional steam pumping equipment at a cost of $159,000.



STACK FACTS

From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited
93-97 Adelaide Street West, TORONTO

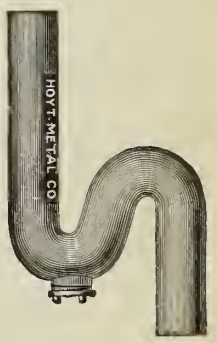


HOYT METAL GOODS ARE KNOWN
FROM COAST TO COAST



As time-savers there are none equal to our Wiping Solder Bar or Wire Solder.
Hoyt Lead Traps, bends and waste pipe are in a class by themselves.

Our Mixed Metal Sales Amount To Over $5,000,000 Annually.



Write your Jobber **HOYT METAL COMPANY, TORONTO, ONTARIO** *Write Us*
New York, N. Y., London, Eng., St. Louis, Mo.



Generates its Own Heat!

Only Pipe Solvent that can be used Successfully with COLD WATER

No need to heat water for **Desolvo.** Simply mix it with **cold** water and it will produce intense heat and powerful gases that will remove all pipe obstructions thoroughly and quickly. Yet it is harmless.
Oldest and most approved pipe cleaner on the market.
Thaws frozen drains and stacks.

Drop a line on your letterhead and we will send you a trial can absolutely FREE.

The Chamberlain Co., Pittsburg, Pa.

Escaped from Germany

AN escaped prisoner tells the story of his fearful experiences in Germany in MACLEAN'S MAGAZINE for November; and gives a vivid picture of conditions in Germany as he saw them. He got out by way of Holland after appalling perils and hardships. In Holland, he was photographed, but so altered was he that his wife quite failed to recognize him in this photograph. Read this story of this Canadian soldier's escape. It is gripping stuff—a rare tale.

Canadian Finances After the War

WILL business in Canada collapse when peace comes? It may. What do the big men say? What do they know? What do you think? Are your opinions well informed? The subject is of the greatest possible importance, and you will get light and leading by reading the contribution of Col. John Bayne Maclean, who has taken the trouble to get the opinion of the biggest and most highly placed men in Canada to help him prepare his article.

Back from the Arctic

WILLIAM THOMPSON, representing the American Geographical Society, was this year in the Arctic Regions. He went to the delta of the Mackenzie River, and took many excellent pictures of the country and its Eskimo inhabitants. He makes the November MACLEAN'S the vehicle of many of his pictures and for an account of his journey. Read what this Arctic scientist has to tell us about a remote part of our land.

Slackers and Conscription

WHAT is your attitude towards the draft? You have positive opinions, of course. How do they square with Miss Laut's as they are expressed in her ringing article on Slackers in the November MACLEAN'S?

The Nation's Business

THIS is a new feature—a fearless, well-informed survey of national affairs. What we all want is an outspoken—but not vindictive—and clear-visioned presentation of factors and facts affecting our national, political and economic welfare.

Sketches of Trench Life

By Gunner McRitchie

MCRITCHIE was a cartoonist on a Western Canada daily before he went overseas. He has done a number of sketches of trench life "On the Spot," and these he has sent home, for publication in MACLEAN'S MAGAZINE. They're interesting and good.

The Late Sir Mortimer Clark

BEFORE he died, a few week ago, the late Sir Mortimer Clark, eminent jurist and an ex-Lieutenant-Governor of Ontario, wrote for MACLEAN'S an article on "Safeguarding Your Heirs." It has to do with the functions, service and safety of Trust Companies as executors of estates. This article by a man so distinguished, so cautious, so able, and so wise a counsellor, can be of first-rate value to every man perplexed with the problem of how his estate can be safely and prudently administered after he, the testator, has passed from this life.

A Complete Novelette

By Peter B. Kyne

HIS story in the November MACLEAN'S is a thunderingly good story of lumbermen and lumbering. Red blood is in this tale of business. R. M. Brinkerhoff illustrates it.

Short Story

By Ethel Watts Mumford

THE writer of this short story—the first of a delightful series by this author to appear in MACLEAN'S—is very well known among short story writers. Delicate fancy, wholesomeness, freshness and finished workmanship characterize all her work.

Short Story

By W. A. Fraser

A MIGHTILY well-written story of India—the kind that we all delight in; tense, bewildering, and lots of action. Fraser never wrote a better short story than this. Ben Ward illustrates it.

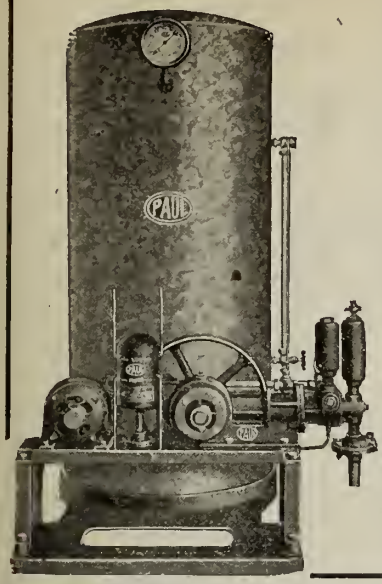
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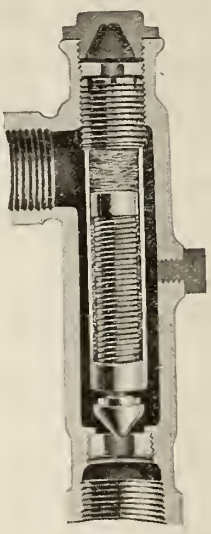
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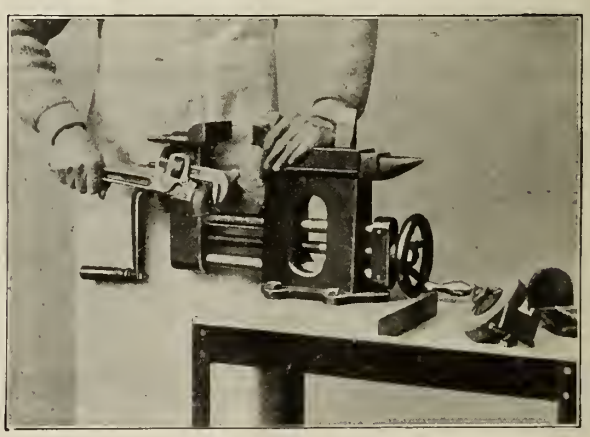
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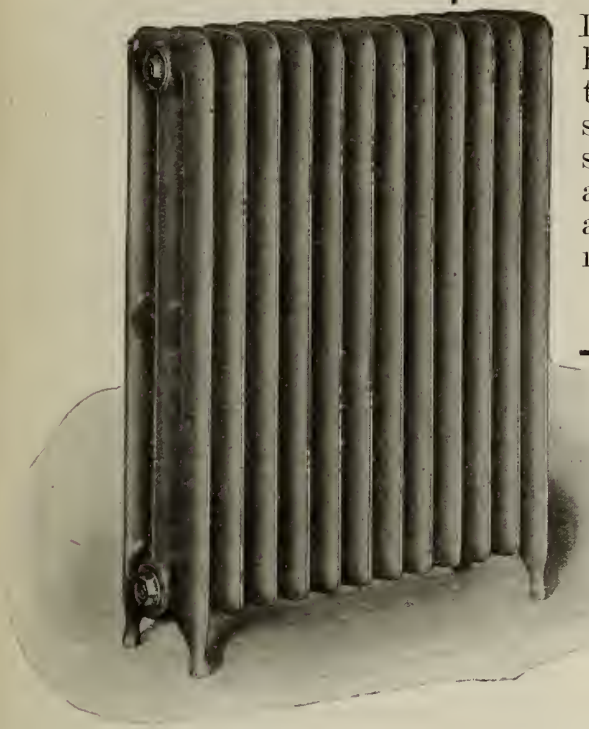
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111 N. Dearborn St.

Mr. Bruce's Counsel

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Frank E. Mutton, Vice-President of the International Time Recording Company, of Canada, wrote the following letter to the publishers of THE POST:

Attention, Editor:

Recently we sent you a subscription covering the delivery of THE FINANCIAL POST to each of our Sales Agents and Salesmen throughout Canada. This was prompted by the fact that, in our opinion, your paper is the best barometer in Canada of what is going on in the different industries from one ocean to the other in this country. Your paper contains information invaluable to any traveling representative of any firm.

(Signed) F. E. MUTTON.

Dated Oct. 12, 1917.

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Talk Current Events

A Talk by H. Addington Bruce, Author of "The Riddle of Personality," "Psychology and Parenthood," Etc.

WHAT do you know about the doings in this great world wherein we live?

Do you try to form a really intelligent and well-considered opinion regarding events the world over?

Do you ever discuss their significance with friends and neighbors?

If asked what you think of any particular event, you are perhaps ready with an answer. Is your answer anything but a snap judgment, determined by prejudice rather than by reasoning analysis?

I put these questions not to be disagreeable, but because, if necessary, I want to spur you to appreciate the value that there is in discussion of current events.

Many people, fortunately, appreciate its value instinctively. Perhaps you are one of these. Many others are beginning to appreciate it.

This is shown by the growing popularity of clubs and classes on current events.

Only a few years ago such clubs and classes were almost unheard of. To-day most of our bigger cities have half a dozen of them or more.

In one city—Boston—a talented woman of my acquaintance draws an income of thousands of dollars a year from her leadership of current events classes.

Other men and women have similarly discovered that interest in current events is increasing so rapidly that they can well afford to organize classes like those conducted by the Boston woman.

Still, there remain many people—thousands of people—who never discuss current events. Many thousands more discuss only such events as come under the headings of "crime," "the theatre," and "sports."

These are the people I want to reach. They are the people I want to rouse to recognition of the practical helpfulness they will find in discussion of current events in general.

Current events clubs and classes might well be organized in every neighborhood, with weekly meetings to take up the outstanding happenings in international affairs, national politics, literature, art, music, science and industry.

Regular attendance at, and active participation in, these meetings will prove to be an education in itself.

It will enlarge the mental horizon and broaden the moral sympathies. By disciplining the mind to active thought it will raise the level of workaday efficiency.

It will make for a more alert, a more conscientious citizenship. It will give zest and color to a life which perhaps has hitherto been pathetically drab.

Unsuspected powers will be awakened. With a better grasp on the realities of life, the whole personality will expand.

One evening a week is certainly not too much to give to a discussion of the day-to-day developments in our wonderful world.

It may mean doing without an evening at cards or at the musical comedy, or at the dance hall. But this, after all, is not a terrible sacrifice.

And from the occasional talk over current events will come more profit than could possibly come from any number of evenings spent in card-playing, dancing, or listening to musical comedies.—Reprinted from the Toronto Daily Star.

WILLIAMS' "VULCAN" CHAIN PIPE VISES

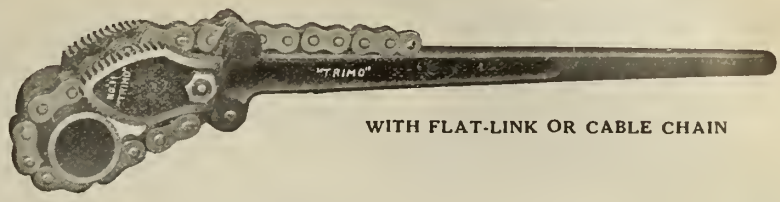


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WITH FLAT-LINK OR CABLE CHAIN



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Edges will not Curl or Wrinkle. Guaranteed for Hot and Cold Water.

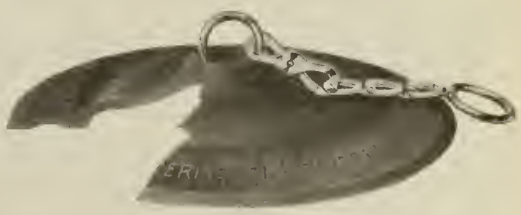


Wolverine Stoppers are so designed that the action of water makes a perfect seat.



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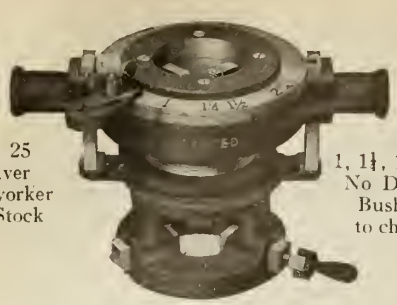
"C" Catalog "C"



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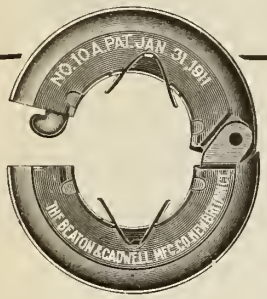
The cost works out at about ½ cent a day for the tool shown in this advertisement.

Call up your jobber now—and order a "Beaver" or at least write for booklet D-12.

MANUFACTURED BY

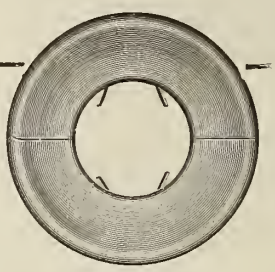
THE BORDEN-CANADIAN COMPANY

TORONTO, CANADA



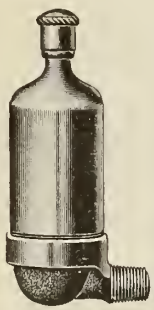
OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

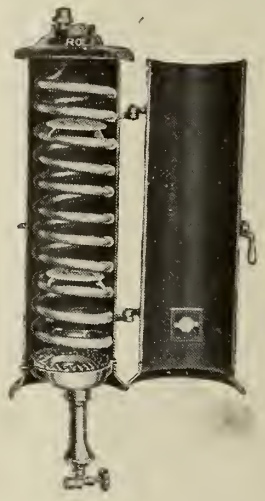
The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

Rolf Gas Water Heaters

No. 6, 7, and 81 Series



We make gas water heaters only, and because we devote our whole plant to this one line we are enabled to make better heaters at a lower cost.

THE ROLF HEATER MFG. COMPANY

Heater Experts

COLUMBUS - OHIO

W. H. CUNNINGHAM, 98 Kingswood Road, TORONTO

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By H. K. Vosburgh **Revised by William Neubecker**

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The Most Practical "Helper" Ever Introduced Into The Tinshop.

PRICE $1.00, Postage Prepaid.

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MACLEAN PUBLISHING COMPANY, LIMITED

143-153 University Avenue, Toronto

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DART



A Dart Union will make the coupling sure and certain and give you a job over which you need have no misgivings. "Bronze to Bronze" seats mean no rust, no deterioration—a right job and a tight job every time. Extra heavy iron parts mean no stretching or pulling apart, and the ball-shaped joint means a perfect connection even when pipes are out of alignment.

For your own sake and your customers use a Dart Union every time.

Saves time—makes sure.
Your jobber sells them.

Made in Canada by
DART UNION COMPANY, LIMITED
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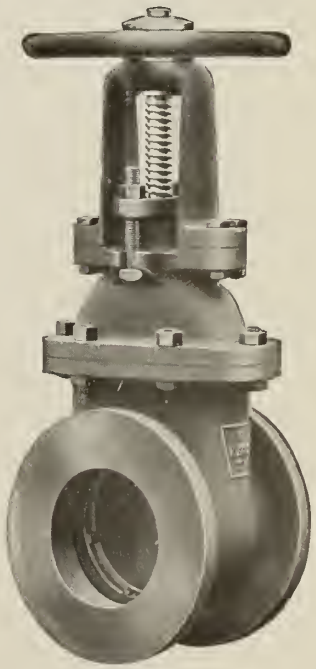
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BRONZE
DOES IT.

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

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Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

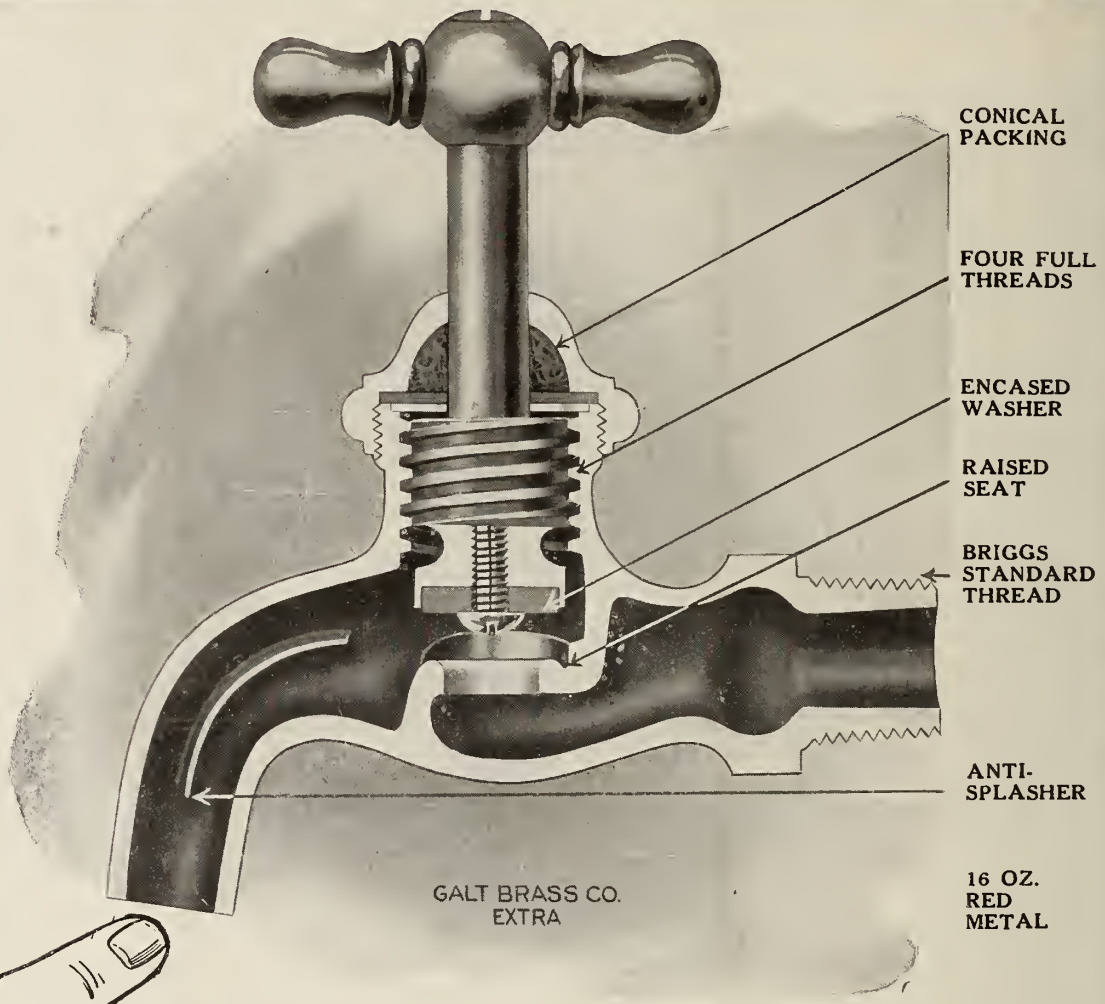
Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

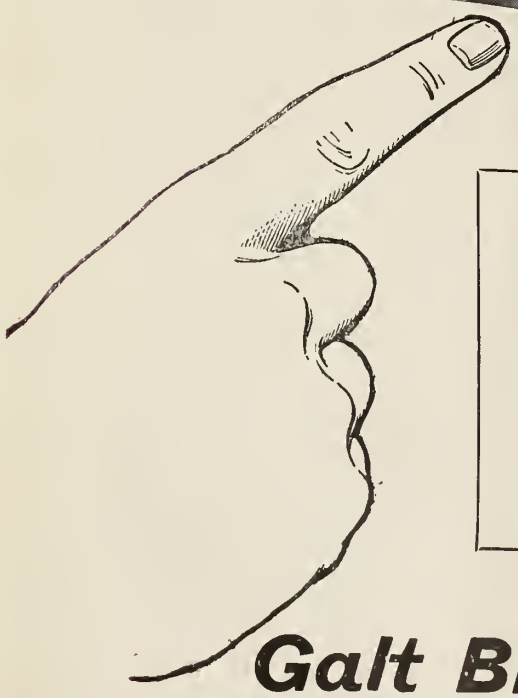
Approved by the Fire Underwriters Association, and Registered by Boiler Inspection Departments of Ontario, Saskatchewan and Alberta.

THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Registered **PERFECTO** *Trade Mark*

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, NOVEMBER 15, 1917 | No. 22

Lend Your Savings To Your Country

Canada's Victory Bonds offer a safe, and profitable investment, not for the rich only, but for everyone. Every man, no matter how small his savings may be, should now hand them to the Government. No investment could be more patriotic, or better calculated to bring the war to a successful conclusion—and certainly none could be safer. All the resources of the Dominion of Canada are your security.

Here is your great opportunity to combine patriotism with profit.

Buy Victory Bonds

Do Your Bit, We're Doing Ours!

EMPIRE MANUFACTURING CO.
LONDON and TORONTO

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for **BEAVER BRAND CAST IRON ENAMEL WARE**

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

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Monarch Brass Mfg. Co., 71 Brown St., Toronto

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CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Prompt Service

Our factories never were in better position to give prompt attention to orders. That means rubber needs for Engineers and Plumbers can be delivered with a promptness that is sure to please.

And to further facilitate deliveries, reserve stocks are kept at all our service branches throughout Canada. Your orders, sent direct to our nearest branch, will receive prompt and intelligent attention.

WE AIM TO SERVE AND PLEASE THE TRADE.

Canadian Consolidated Rubber Co. Limited

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Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

The Largest Manufacturers of Rubber Goods in the British Empire.

"Standard"
"Perfection" Built-In Baths

Made in One Piece Enamelled All Over



These Baths represent the last word in design and finish, and are made to build into Right or Left Hand Corner or into a Recess.

The "Perfection" Built-in Bath is only 17½ inches high, therefore convenient. It builds into walls and floors, the absence of all dust-collecting cracks and corners, meaning bathroom sanitation.

Made in 5 and 5½ foot sizes.

Illustrations on request.

Write the nearest dealer.

Standard Sanitary Mfg. Co.
Limited

General Office and Factory, Royce and Lansdowne Aves., Toronto, Ontario

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Hamilton Store:
20-28 Jackson Street West

Montreal:
4 Beaver Hall Square

Calgary:
31 Canada Life Building

Vancouver:
847 Beatty Street

"MADE IN CANADA"



Here's a plan of a park of the usual type. Note how its paths wind back and forth —back and forth. The Burnham's fire travel "paths" do much the same thing.

Park Paths and Burnham Boiler Fire Travel Their Alikeness

EVER start on one side of a park and try to get to the opposite side—*quickly?*

Had a job on your hands, didn't you?

Had a job on your hands because the park paths kept you from going the shortest way—in a straight line.

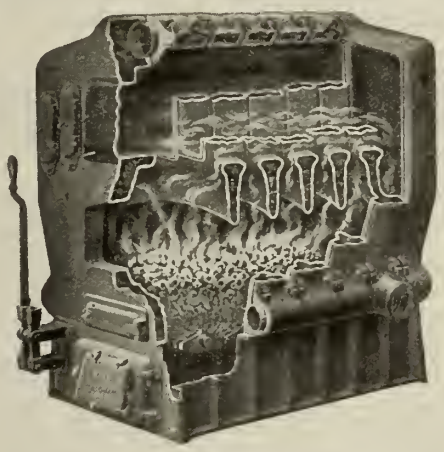
They took you in the *longest way—the winding—back-and-forth way.*

The Burnham fire travel "paths" do the same thing to the hot gases.

They don't let them rush in a jiffy direct to the smoke-box.

They make them wind back and forth *three times* on both sides of the boiler before they finally let them pass out to the chimney.

All the time they're winding back and forth, they are giving off heat to the water-filled sections, until by the time they reach the chimney they have just enough left to create the proper draft—*no more.*



The Square Sectional Burnham Boiler cut through at the side. Note how the hot gases wind back and forth three times on both sides of the boiler.

Maximum amount of heat goes to heat the rooms to be heated. Minimum amount goes to heat all outdoors.

Which is the main reason why the Burnham coal bill is the short one it is.

A short-coal-bill boiler is the kind of boiler to sell in these times of mounting coal costs.

So send at once for our catalog.

Lord & Burnham Co., Limited

(Boiler Department)

Royal Bank Building, Toronto

Of Canada

Factory: St. Catharines, Ont.

Burnham Cosy Comfort Heat

BB

For the present give your attention to the Victory War Loan. Afterwards the second best thing is B.O.T. Water Closets and Canadian Brass Goods.

THE CANADIAN BRASS COMPANY - GALT, ONT.
TORONTO OFFICE: 159 Richmond St., West



Pipe Threading Tools

Another problem that was solved by a "Toledo"

The upper end of this 6-inch pipe split. Ordinarily it would have been necessary to rig up a derrick, block and tackle and draw the entire length of pipe from the ground before repairs could be made. With a No. 3 "Toledo" Tool on the job the pipe was cut and threaded in position and the needed new section coupled on.

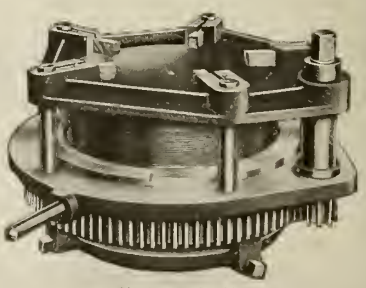
"Jardine" and "Toledo" Tools

are daily solving problems of all kinds. They work in any position and cut threads as clean and perfect as if turned on a lathe. They are portable, convenient, simple in construction, effective, economical.

Ask us to tell you how you can without expense, prove to your own satisfaction that "Jardine" and "Toledo" Tools are all that we claim. Ask us to-day.

A. B. JARDINE & CO., LIMITED HESPELER ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.



"Toledo"
Geared Adjustable Threading
Tool No. 3



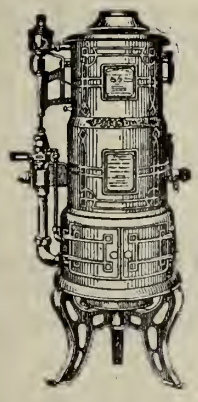
An Argument DeLuxe

The Point

that we wish to bring out is the fact that

"Pittsburgh-Bungalow"

Instantaneous, Automatic Gas Water Heater



can be sold the year round—at a profit—right now and throughout the balance of the Fall and Winter—and we help you do it. Our Service and Maintenance department will keep them sold for you.

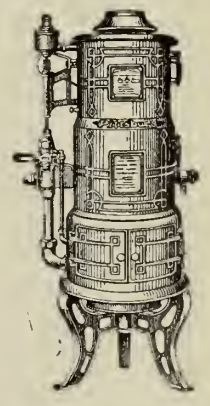
Get this sales viewpoint and explain to your trade:

The coil in fire box of furnace or heating plant connected to storage boiler does not furnish the Hot Water at no cost—as additional fuel energy is required. Therefore, an automatic gas water heater is an economical appliance to use all the time.

Remember, too,—

The "Pittsburgh-Bungalow" is the only thermostatically controlled water heater with a capacity of three gallons per minute that sells at a price in keeping with the purse of the general public.

We will be glad to help you make that sale.



PITTSBURG WATER HEATER COMPANY

Canadian Warehouse: **124 Richmond Street West, Toronto, Ont.**

DISTRIBUTORS:

WINNIPEG	MONTREAL	TORONTO	CALGARY
	99 Drummond St.	12 Queen St. E.	



Victory Bonds

AND

Peerless Water Systems

ARE BOTH

Canadian Institutions

Equally Reliable

Exchangeable, One for the Other

NATIONAL EQUIPMENT CO., LIMITED

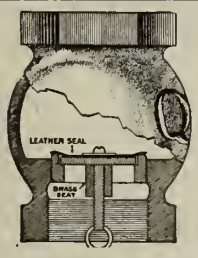
TORONTO, ONTARIO

Peerless
WATER SERVICE
SYSTEMS

Tanks
Tanks
Tanks

Pneumatic
Air
Storage
Oil

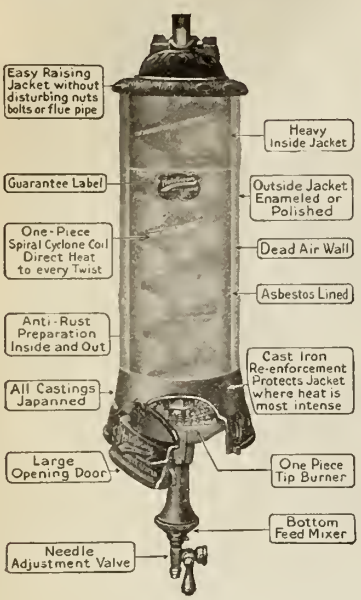
LOTS OF STOCK—
QUICK SERVICE



"Q" Foot Valves
"Just Can't Leak"

NATIONAL EQUIPMENT CO., LIMITED
Toronto -:- Ontario

Service-Speed-Economy



The Hotstream HEATS WHILE YOU BATHE TRADE MARK REG. WATER HEATER

BEST FOR BAD WATER

Quality Survives

Also Made With Cast Iron jacket.

The Hotstream Heater Co.

CLEVELAND, OHIO

W. H. CUNNINGHAM, 98 Kingswood Rd,. TORONTO
Canadian Representative

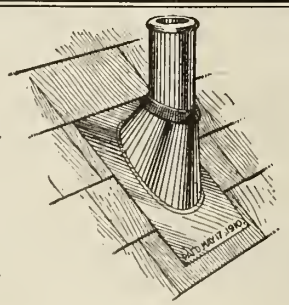
IT IS IMPORTANT!

If you have something to dispose of in goods or service that as many buyers as possible get to know you and your product. This can be accomplished through

Sanitary Engineer

143 University Avenue, Toronto

The "Simplex" Roof Flashing



The shape of the sleeve makes it possible to fit any pitch roof from 50° to flat. Made of very best galvanized iron or copper with pure lead collar. This is the simplest and best adjustable roof flange on the market.

Ask your jobber to supply "Simplex" on your next order.

SIMPLEX SALES COMPANY
313 Clinton Street CHICAGO, ILL.
Canadian Representative; W. H. CUNNINGHAM,
98 Kingswood Road TORONTO, ONT.

WHEN YOU NEED IT

Type "K" Brass Gate Valves

will give you the service you need at all times and under the most trying conditions.

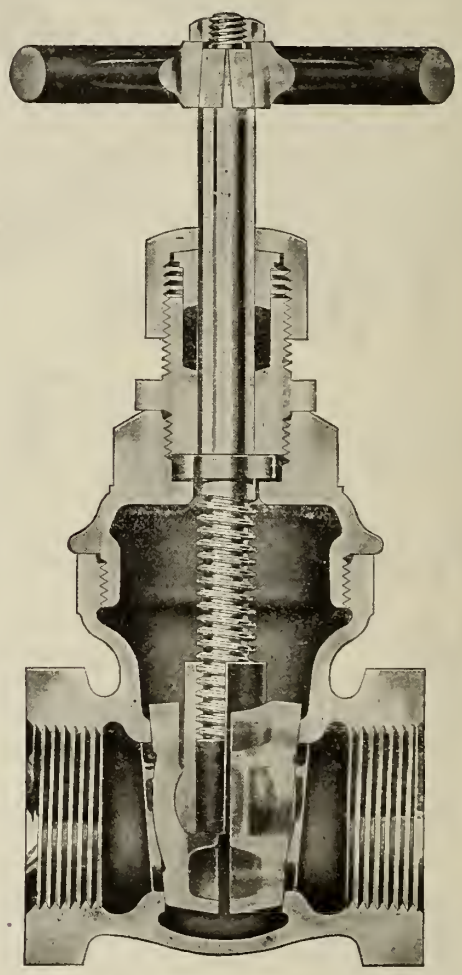


Fig. 300 SECTIONAL VIEW

They have a reputation for reliability, long life and sustained efficiency. In competition with other makes they are admittedly the

STANDARD OF COMPARISON

This indicates *superiority.*

Catalogue No. 8 free on request

Jenkins Bros. Limited

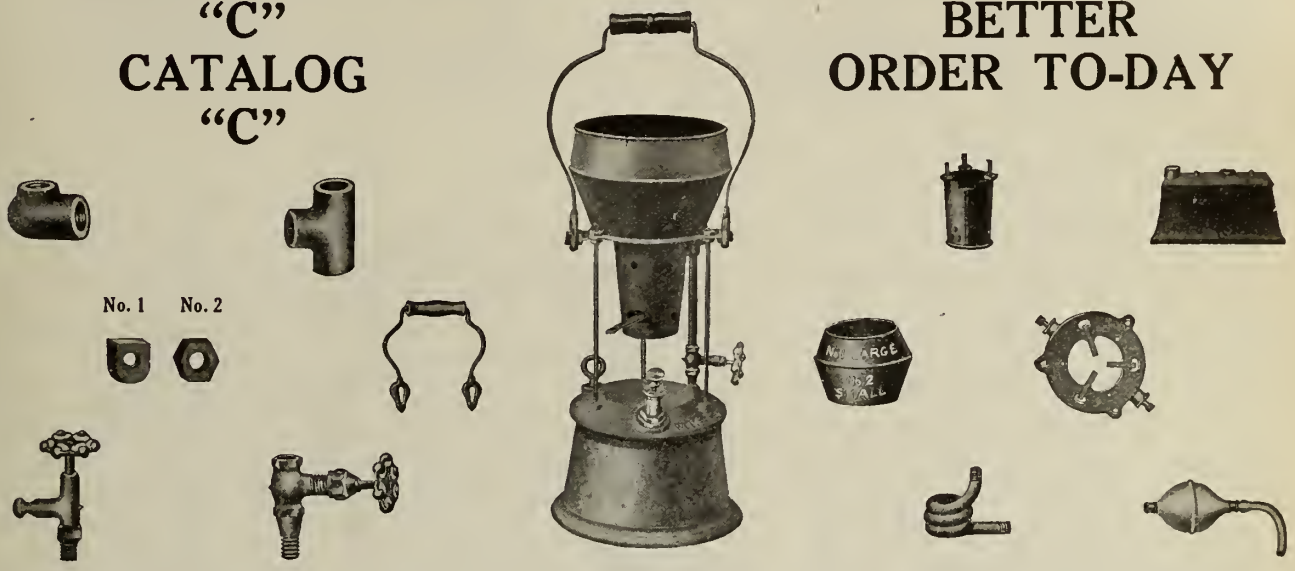
103 St. Remi St. - Montreal

FURNACES AND REPAIRS—

are you prepared for the winter months?

"C" CATALOG "C"

BETTER ORDER TO-DAY



CANADIAN WOLVERINE COMPANY, Ltd.

CHATHAM, ONT.

Who is going to supply these systems?

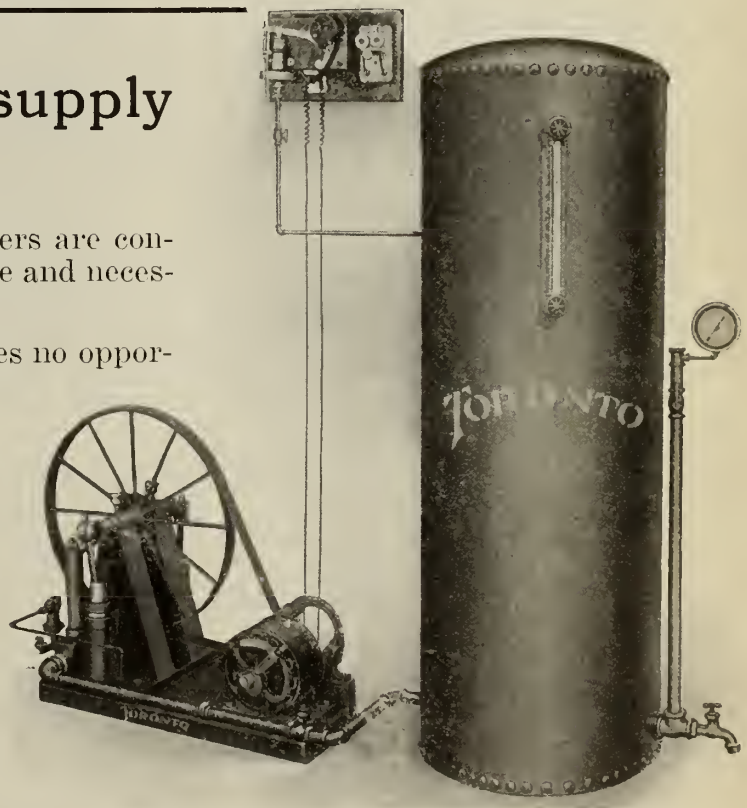
Provincial Governments and Farm Papers are constantly urging upon the Farmer the value and necessity of a reliable Water System.

The hustling Sanitary Engineer who loses no opportunity of laying

ONTARIO WIND ENGINE & PUMP CO. LIMITED
TORONTO

Water System facts before the Farmers of his locality is the one who'll gain most from this educational campaign. The obvious advantages and economies of "TORONTO" Systems appeal strongly to the astute husbandman, and he's going to have one sooner or later. Keep after him till you get the order.

Write for our Prices and Circulars to-day.



ONTARIO WIND ENGINE & PUMP CO., LIMITED

Montreal TORONTO Regina

SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, NOVEMBER 15, 1917 No. 22

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EDITORIALS

Montreal Trade Take Note—Value of Mechanic's Advice—The Victory Loan—Have You Bought a Victory Bond?

The MacLean Publishing Co., Limited

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Edwin Newsome, *Editor*

R. L. Netherby, *Western Ontario Representative* Fred McLaughlin, *Eastern Ontario Representative*
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Published on 1st and 15th of each month. Subscription, Canada, $1.00; United States, $1.50; Great Britain and the Colonies, 4s. 6d.; Elsewhere, $2.00.

Cable Address Macpubco, Toronto; Atabek, London, England.

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EVERY TANK GUARANTEED

Never a Sign of a Leak

EVERY FITTING TESTED



Several hundred thousand "Vitro" No-Trouble Tanks have already been installed—some have been in use ten years—and not one has become leaky or troublesome.

That's not just a strong statement — it's an actual, proven fact—a fact which satisfies our many customers that the "Vitro" idea of construction is right.

There's one thing you can be absolutely sure of if you install "Vitro" Tanks—that you're giving your customers the best value possible and the most efficient tank made. Every "Vitro" Tank you install helps you to gain a reputation for good work. Ask your jobber about "Vitro" Tanks.

MADE-IN-CANADA

AGENCIES:

QUEBEC PROVINCE: Mechanics Supply Co., Limited Quebec, Que.

MARITIME PROVINCES: The Jas. Robertson Company, Limited, St. John, N.B.

Cluff Manufacturing Company, Limited

81-111 Sterling Road, Toronto, Ontario

HANDLED BY EVERY JOBBER FROM COAST TO COAST

It's a Step Towards Big Business

Supposing you were to install in one of the factories in your town a Factory Wash Sink;

Supposing that Sink was made in Port Hope, which means that it would be entirely satisfactory;

Supposing the manufacturer discovered that the Sink was a greater convenience than he had ever dreamed possible — that it saved much of the employees' time and induced habits of cleanliness—that it made the men feel better and work better;

Supposing all this, don't you think you would stand the best chance of getting the next sanitary or fitting job that factory had to give out?

All business is built on confidence, and there could be no better means of gaining the confidence of these men of big business than the installation of a Port Hope Sanitary Wash Sink. Besides, it's profitable. They are made in 14 different styles and in lengths from 5 to 30 feet. We will gladly help you land an order.

Port Hope Sanitary Mfg. Co., Limited

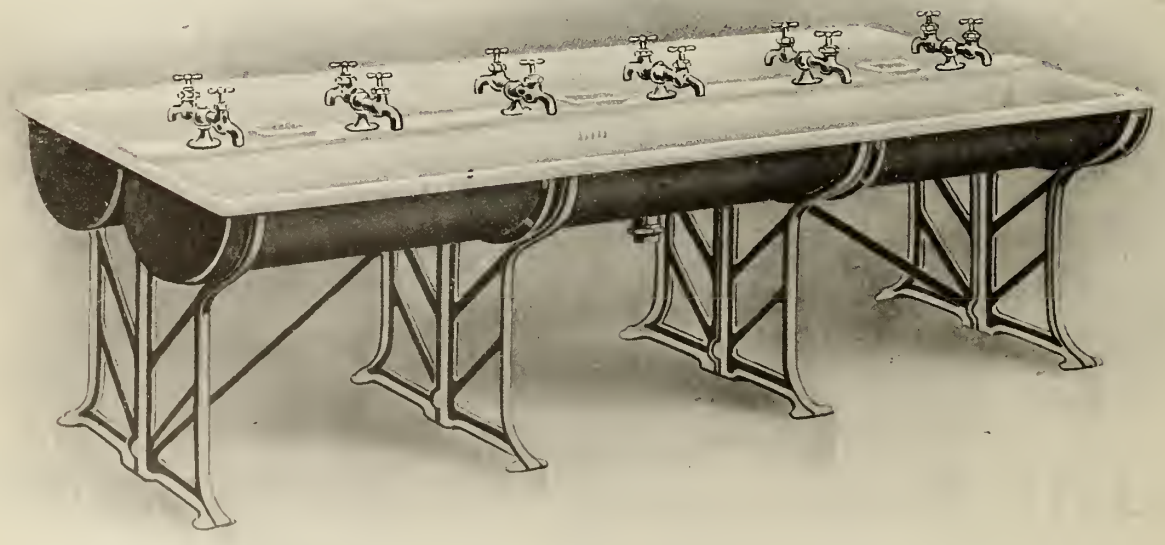
Factory:
PORT HOPE, ONTARIO

Head Office:
ROYAL BANK BUILDING, TORONTO

TORONTO SHOW ROOMS
119 King St. East

WINNIPEG OFFICE
405 Tribune Bldg.

MONTREAL SHOWROOMS
234 Beaver Hall Hill



SANITARY ENGINEER

VOL. XI NOVEMBER 15, 1917 No. 22

U.S.Govt.RecognizeSanitary Engineers

President Wm. C. Groeninger Addresses the Members at Their Annual Convention Held in Grand Rapids, Michigan—A Short History of the Society, Its Aims and Objects.

IN THE city of Washington, D.C., in January, 1906, twenty-five inspectors of plumbers and sanitary engineers from various sections of the country, met and organized the Society of Sanitary Engineering. The effect of this organization upon the general betterment of sanitary work is all out of proportion to the number of members and finances. This can only be credited to the hard, conscientious and persistent efforts of many of its members. Without any remuneration or personal ambition, the members of this society have done their bit in the interest and for the advancement of sanitary science. We are purely a voluntary organization of thinking men banded together for the above purpose. The members are called upon to sacrifice their spare time to assist in this movement to improve the sanitary environment of man, to give him more efficiency at a lesser cost, to lessen the opportunity of sickness, and to prevent insanitary conditions that are favorable to the origin and development of disease. Every time a study is made of sickness or crime, it will be found that the plague spots are grouped right around places where the sanitary conditions are bad. Remove filth and you remove the cause of disease. Personal hygiene is largely a matter of environment. The better the sanitary environment the simpler it is for people to attend to their personal cleanliness.

Keeping in good health by right living is the duty of every American. It has been well stated that sanitary education is even more important than sanitary legislation. Progressive health departments who have had the foresight to preach the gospel of sanitation, know and realize its importance in the prevention of disease. Sickness will hamper the national efficiency whether among soldiers or non-combatants. Disease prevention is a good form of preparedness. More men have died from typhoid fever in the United States in the past ten years than were killed in the armies of the North and South of the Civil War, yet typhoid fever is a preventable disease. Preparedness against preventable disease should include vaccination against typhoid fever and smallpox.

The mobilization of the country's agricultural products must go hand in hand with the preparation of putting industrial establishments on a war footing. The health of the nation depends in a large measure upon its food. Upon the sanitary equipment in our factories depends the efficiency of the workers, which in turn controls the output. According to health experts, Germany saved enough men from smallpox in the past ten years to offset her terrific losses at Verdun. Figures compiled by Canadian health officials show that the Dominion's losses since the European war started are considerably less than the loss from preventable diseases at home during the same period. Reduction of the infant-mortality rate will help repair the wastages of war. It therefore becomes the patriotic duty of the members of this society to prosecute with increased vigor our campaign against preventable diseases.

Water supply, water purification, plumbing and drainage, sewerage, sewage disposal, and sanitary equipment are vital subjects in connection with the prevention of disease. The benefits of a million-dollar water supply may be neutralized by illegal cross connection with a dual supply of doubtful origin.

This society was originated primarily to bring about uniform laws governing the installation and maintenance of sanitary equipment, plumbing, and drainage. The men who were responsible for the organization of this society had the foresight to realize the importance and necessity of standardization. The inspiration of these men will eventually lead us to standards. It is a purpose worthy of audacious persistency. There are better ways to do everything now accomplished. The simplest device can still be simpler, the speediest engine quickened, the sanest system convicted of waste. Theory and precedent in plumbing practice are doomed. Prejudice, local pride, self - mercenary interests, and indifference are the brakes applied to retard standardization. Progress has been delayed for lack of unity of action. Let us remove the brakes. We are still going uphill and need all the power to climb. Our committee on research is gradually removing the grades and smoothing the road. Standardization is just common sense under another name. It is hoped that some definite action will be taken at this meeting which will bring about the desired results.

The National Health Problem

With the departure of the immigrant population to the seat of war the movement of negroes from the South to take their places in the big industrial enterprises has raised a social problem as difficult to meet as any by which our country is confronted. A problem that is one that our health officials must assist in solving by a vigorous campaign against insanitary conditions in the slums of our cities and villages. A prominent educator once said, "You cannot hold any man in the gutter without staying in the gutter yourself," and he was right. As a matter of self-protection it behooves the health officials to see that the negro is surrounded with the proper sanitary safe-guard.

Without discussing the race question in any way, let's look at a few outstanding facts: The negro is compelled to live in the worst sections of our cities, often without public water supply, drainage, or sewerage, or garbage service, without any of the sanitary equipment in house, yard, or street which is considered so necessary to comfort, convenience, health and welfare. The negroes who live in these insanitary conditions are laundresses, nurses and cooks. If there is a contagious disease in their own home (and there is much of it) they are sure to bring it to our homes, either personally or through the laundry. Health officials should insist that the negro be protected by the sanitary safeguard, which is one way of preventing disease. The adoption and rigid enforcement of regulations providing for the removal of the backyard privy vaults, the installation of a pure-water supply, plumbing, drainage, sewerage and sanitary equipment in the buildings that house our negro population will materially assist in solving this problem. Buildings that are not fit for human habitation or occupancy should be condemned.

During the past three months an active campaign was made to interest State and local boards of health and sanitary

engineers, plumbing inspectors and the manufacturers of sanitary equipment in the work of this society. Favorable replies were received from many assuring their co-operation. Lack of funds and the necessity of strict economy has affected the attendance of many State and municipal health officials. Continuity of effort in this direction will produce results and tend to increase the membership many hundred per cent. Through our friend and first vice-president, Mr. L. A. Cornelius, who is also our host, the convention committee, etc., we are indebted for a list of the plumbing inspectors of the United States. Vice-president Cornelius not only secured the names of more than four hundred plumbing inspectors but without any expense to the society, sent out a circular letter, program and return postal. His initiative and energy has been a wonderful stimulant, and as president of the society, I deeply appreciate his co-operation and assistance.

To the Board of Directors I desire to express my appreciation for their willingness to serve on any and all matters pertaining to the welfare of this society. When you take into consideration the fact that all of us have only a small amount of spare time of which to give to the affairs of this society, it is really remarkable to realize all that has been accomplished.

If ways and means can be provided to take care of the rapidly accumulating correspondence in a businesslike manner, the greatest part of our difficulties will be overcome. It is unfair to ask any officer or member of this society to use the time that should be given to his official position for the work of this organization. Either the duty of his official position will be interfered with or the work of this society will remain undone. All of us are willing to give a great portion of our spare time, but spare time will not produce a good business organization, without which no organization or society can possibly prosper.

Experts Condemn Wrought Iron Pipe

In This Article Various Water Works Engineers and Expert Metallurgists Give Reasons Why Wrought Iron and Steel Pipe is Not as Good as Cast Iron Pipe —If Clean Water Will Corrode Wrought Iron and Steel Pipe, How Can Such Material be Expected to Withstand the Corroding Influences of Sewer Air?

FOR some time SANITARY ENGINEER has been carrying on a campaign against the use of wrought iron pipe for soil and waste pipes. The reason for so doing is simply to show our readers what is and what is not the fit and proper material to use under certain conditions.

We do not for one moment condemn wrought iron pipe for all purposes, and we desire this to be clearly understood, but we will show that 90 per cent. of the troubles that require costly repairs to be made in sanitary and heating engineering construction are the result of either substitutes or improper formulas which have been put to use when making up the goods installed by our craft.

The use of wrought iron pipe for the purpose of conveying sewage or foecal matter from our buildings into our main sewers has been proved time and again to be impractical, improper and costly into the bargain, but our craft or profession is not the only one that condemns wrought iron pipe and steel for use in their installations. We refer to waterworks and water mains, as well as, in a few cases, gas companies and metallurgists, as is proved by Alexander Milne, president of the American Waterworks Association in 1912-13 and superintendent of the waterworks commission, St. Catharines, Ont.

Mr. Milne prepared a paper on steel pipe and we have reprinted a number of paragraphs therefrom, that will no doubt be of great interest to every reader of SANITARY ENGINEER, because the experiences given relate to just what is taking place where wrought iron pipe is used, even when conditions are purposely made much more favorable for wrought iron pipe. Even in such cases, however, wrought iron pipe is being replaced by the mile.

> During the years 1910-1911 the writer was securing the necessary data for the preparation of report and estimates on the construction of several miles of large sized water mains for the City of St. Catharines, Ont., and, with the view of obtaining all the information possible before submitting a report thereon, devoted considerable time and correspondence in the investigation of the respective merits of the several different types of pipes now on the market for that work. Entering upon this investigation without bias, and to some extent perhaps with but slight knowledge of the relative values of some of the materials used, and having the sole object in view of obtaining the "BEST" material for the purpose, he found the topic an interesting one when fully opened for comparison as to FIRST COST, DURABILITY, EFFICIENCY, etc., the correspondence involved furnishing a mass of data, some of which may be of interest to consulting or municipal engineers engaged in problems of like character.

It will be seen by the above that the same questions are involved when sanitary and heating engineers are choosing material for use in sanitary and heating installations, first cost, durability and efficiency. So that we are doing only our plain duty when we investigate thoroughly the how and why certain materials should be or should not be used.

> During the last century the rapid advance in methods of production and manufacture of iron has led to the adoption of this material for this purpose, and at a price compared with the early years of its adoption that has resulted in the cheapening of the cost of distribution to such a point as to be within the reach of all.
>
> It is now over two hundred years since cast iron began to be generally employed for making water pipes, and this material has continued to be that most generally employed. In the latter part of the last century other materials have been introduced, such as wrought iron and later mild steel. Thin plates of these materials are made and joined in different ways, viz., welded, riveted, and several patented forms of special joints. One of the principal attractions advanced in favor of these materials is the fact that, owing to their high tensile strength as compared with cast iron, a materially less weight of metal is required to form a pipe which will sustain a specified pressure. This reduction in weight is offset by the fact that the wrought iron or steel is a more expensive product weight for weight than cast iron, but even so considering only the question of meeting the pressure requirements, a cheaper pipe can usually be produced by using wrought iron or steel.

The question of high tensile strength is referred to in the above paragraphs, which no doubt is a greater factor in waterworks construction, but even waterworks mains have no practical reason to require such pressures as mentioned, even after allowing several thousand pounds of overload. No water mains are required to withstand a greater pressure than that which cast iron pipe will stand; so why should the question of tensile strength be considered to the extent that it is when discussing soil, waste, vent and drainage systems?

The main question involved in regards to these discussions is durability and Mr. Milne has shown in his paper that cast iron pipe has to date proved to be the most durable pipe in existence at least for water mains, etc.

> The question of the constitution of commercial metallic products and their behavior under different conditions of service, is one affording unlimited scope for investigation and study. The metals used in commerce differ from those known to the laboratory student, in that, instead of being composed of a simple metallic element, they actually consist

of a large proportion of the element whose name they bear, but with admixtures and combinations of other elements in infinite variations and complexity. The substance known as iron is the metallic element which occurs most widely in the earth's structure, but, as accessible to man, it is never found in an absolutely pure state, but always in combination with other elements for many of which it has a high degree of affinity. By dint of painstaking processes it is quite possible for the chemist to isolate small quantities of this metal in a condition absolutely free from any impurities. In the production of iron on a commercial scale, however, such refinement is manifestly impractical, and consequently the iron of commerce is brought down to a condition of relative purity by such industrial processes as do not involve a prohibitive cost when applied on a large industrial scale. Thus, as is generally known, the commonly occurring ores are subjected to the action of heat in blast furnaces in conjunction with limestone and other inexpensive and easily obtainable materials, the result being the pig iron of commerce, composed of a preponderating proportion of pure metallic iron with a small percentage of carbon, silicon, sulphur, and phosphorus, and to a lesser extent of other substances principally metallic. The cumulative experience of years enables these impurities to be controlled and kept within such limits that the product is perfectly applicable for the ordinary purposes for which it is required.

Within comparatively recent years great advances have been made in the direction of treating the iron in Bessemer and open hearth furnaces, by which means the impurities are practically got rid of with the exception of a small definite proportion of carbon, the existence of which is the characteristic feature of steel, and is beneficial to the material. Systematic methods of manufacture have resulted in the production of a mild steel that for most purposes has superseded the earlier wrought iron.

The presence, however, in pig iron of the impurities mentioned is not without some advantages. Principally, it enables the iron to be melted by the application of a moderate furnace temperature, which cannot be done with the more highly purified wrought iron or steel, and thus the metal can be formed into any desired shapes by the process of casting in moulds. The lack of homogeneity of the material results in a less degree of strength, particularly in the direction of tensile strength, but, even so, cast iron ranks high among the materials ordinarily employed for construction.

A peculiarity of cast iron which is sometimes overlooked is that the elastic limit only falls a little short of the ultimate strength; so that the actual capacity of the material to carry a load is greater than the comparison of the ultimate strength would indicate. The actual ultimate tensile strength of a fair quality is about 18,000 lbs. per square inch. Taking as an example a cast iron pipe 12 inches in diameter and ⅝ inch in thickness, it would take an internal pressure of 1,875 lbs. to burst the pipe, and a somewhat less pressure would be sustained without inducing any permanent strain on the material.

Comparing this with steel, the class of steel usually employed for the manufacture of pipes has an ultimate tensile strength of 55,000 to 60,000 lbs., but the elastic limit would be reached at about 30,000 lbs. To resist the same bursting pressure therefore without exceeding the elastic limit, a steel pipe of 12 in. diameter would need to be ⅜ in. thick. Beyond this it must be remembered that the joint welded or riveted cannot be safely counted upon for the full strength of the plate, it being usually considered that there will be a decrease of strength of 15 to 20 per cent. at this point, which must be taken into account.

In the next issue we will show why cast iron pipe is more durable when surroundings are decidedly unfavorable to both even though extraordinary precaution is taken to use all manner of non-corrosive coatings on the pipe. Even the coating itself is disintegrated by wrought iron rusting.

Overhead Expenses and Profits

Being the First Part of an Address Given at the Regular Monthly Meeting of the Toronto Society of Domestic, Sanitary and Heating Engineers on Overhead Expense and Profit.

By Garrett F. Frankland, Secretary of the Ontario and Toronto Societies of Domestic Sanitary and Heating Engineers.

I TRUST you will bear with me while I endeavor to show you how necessary it is that all members of the trade give a little more thought to the question of overhead expenses.

In spite of the scores of books published on this question, all the articles that have appeared from time to time in our trade journal, SANITARY ENGINEER, I venture to say that not one member in ten has really gone into the matter as seriously as he should have done.

Several months ago, you will remember, we were privileged to hear an address from Mr. D. Maclulich of Keiths, Ltd., Toronto, in which he outlined a very simple method of book-keeping. This address appeared later in SANITARY ENGINEER and, for your information, was commented upon at some length.

It would be interesting to know how many members took advantage of the address referred to and improved their system of book-keeping.

Some few weeks ago we were favored with an address on uniform price maintenance by Mr. C. D. Henderson, of the Henderson Business Service, Brantford.

Mr. Henderson is, as we all know, one of the most successful business men in the trade. He is anxious to see the craft better off and in possession of a



G. F. FRANKLAND.

fairer quantity of this world's goods than can be procured by present day methods of conducting business.

The question of overhead expenses is not something mysterious, there is nothing in it that cannot be easily understood. It does not require any very deep study to arrive at a true definition of what overhead expenses are.

For example, it costs to buy and it costs to sell; you cannot buy a pair of basin cocks or a range boiler without incurring a cost in addition to the figures marked on the invoice. It may be you telephone for a range boiler. The phone costs money; your time costs money. The shopman must accept it at the shop door. Then when you sell it, it costs money to re-handle it; an invoice has to be made out; there is postage; a portion of book costs is involved; in fact, the cost is the figure on the invoice plus so much for overhead expenses. Then there is the collecting of the account, the cost of having your money tied up in the boiler, and so on. So it is very plain that there are other items of expenses involved in buying as well as in selling goods.

You will, I hope, agree with me that the heating goods manufacturer, the plumbing goods manufacturer and supply man are not doing themselves any injustice when they quote the consumer a so-called preferred trade discount of 20 per cent. on the one hand and 25 per cent. on the other, far be it from them to cut themselves off without their over-

head charges, which go on before they ever consider their own profit, let alone the additional preferred trade discount, and I venture to say that in their case the overhead charges will amount to more likely 40 per cent or 50 per cent. and may be 60 per cent.

You have all had a chart placed in your hands, which I would like you to read over, and as time goes on we will refer to the various items, all of which and more we have to allow for in conducting an average plumbing and heating business.

I have noted of late considerable discussion among credit men on this subject. They say that everyone engaging in business of any kind should be compelled by law to adopt a proper system of bookkeeping before he commences business, and to my mind this would do away with the large percentage of failures and losses resulting from the lax methods adopted by the majority of men going into our line of business.

I am taking for the basis of my argument a business with a turnover of $15,000 during one year.

What constitutes overhead expense? Everything that is paid for which you do not charge directly to a customer, or provide for in your estimates on contract work.

Salary

First of all we have salary. This is naturally thought of first because that is about all those in the trade get out of their business, or as they sometimes put it, "that's the profit." That is only one little point wherein they err, because profit and salary are at the two extremes of our business, salary being one of the first items that occurs when we do a job, while profit does not come in until the work is all done, the account paid, and the material, labor and overhead paid for by you. The necessity for salary or cost of management commences when you start in business, and is therefore chargeable to overhead expense. So that no objection will be taken to our figures, which will be within bounds, salary is placed at $1,100, and is arrived at on the basis of a journeyman's wages for forty-four hours per week and fifty weeks for a year, at $4 per day. For you could get that much if you labored for some other employer, and you could have two weeks holidays for hunting in the fall, or fishing in the summer. You will agree with me that you would not want to take any less for salary, so that salary is item number one. Of course if you are working with tools part of the time, you will see that the productive labor is charged accordingly, and the remainder as an item of overhead expenses.

Rent

Secondly, we will take rent, placing same at $30 per month, a total of $360. You should not dodge this item because you own your house, and work from there, or own your store. You could rent these premises to someone else and derive the above amount from a tenant. Value your property, and take 5 per cent. of same, then add the expense of upkeep, taxes, insurance etc., and you will have the actual cost to you as rental.

TABLE I.—ON OVERHEAD EXPENSES.

Salary	$1,100.00
Rent	360.00
Light	12.00
Heat	45.00
Telephone	52.00
Bookkeeper	520.00
Insurance and workman's compensation	60.00
Taxes and license fee	10.00
Freight and cartage	26.00
Car fares	24.00
Tools	104.00
Collections	50.00
Bad accounts	75.00
Driver and shopman	390.00
Waste material	70.00
Replacing defective goods	35.00
Labor lost	230.00
Allowance and Discounts	75.00
Interest on capital	90.00
Postage	25.00
Stationery and printing	36.00
Society fees and trade papers	20.00
Advertising	28.00
Total	$3,932.00

$3,932.00 = 26 21/100 per cent. on a turnover of $15,000.

Light

Third, light, $12 only being charged for the lights used in the basement, shop and office for one year—not too much is it?

Heat

Fourth, heat, we need coal to keep warm when we are figuring on contract work, or we might freeze up, and not get the price low enough, so that we must buy 5 tons of coal at $9 per ton, or in all $45.

Telephone

Fifth, a telephone costs $52 per year.

Horse and Waggon or Auto

Sixth, you have one or the other, or you are paying for it in other ways, such as the cartage agent, bicycle, extra car fares, or taking it out of your own hide, and don't know it. I only say $490, and I consider that is cheap for anything like an auto service.

Book-keeper

Seventh, book-keeping, and office help; $10 a week is mighty low, and the total of $520 is justified to my mind. Anyway, on a turnover of $15,000, you will scarcely get office help at this figure, even if you are a wizard and work both night and day, or have your family attend to this item for you.

Insurance and Workmen's Compensation

Eighth, $60 for insurance and compensation for workmen I do not think out of proportion for a business of this size. Say labor has cost $4,600, 1 per cent. to the Workmen's Compensation Board amounts to $46, while for fire and accident insurance on stock and auto, you will not do with much less than $14.

Taxes and License Fee

Ninth, business tax and license fee. Is $10 too much? If it is at this date, it will not be in 1918.

Freight and Cartage

Tenth, this amount of $26 is not out of the way, and you have more or less extra carting to do outside of what you are able to attend to with your car, besides the freight and express on numerous shipments made to you.

Car Fare

Eleventh, $2 a month for car tickets; rather will you find it amount to that much per week. Say $24 anyhow.

Tools

Twelfth. New ones to replace broken ones, lost ones, and you have them repaired. Will $2 per week be too much or $104 in all?

Collections

Thirteenth. The number is suitable to the item if you are superstitious, for you know that when they are so bad that you have to hand them to a collector or lawyer, it means another $50 at least.

Bad Accounts

Fourteenth. Bad accounts at $75 is very conservative.

Driver or Shopman

Fifteenth, $390 for driver or shopman will not be objected to when you consider that if you kept a helper around the shop at $7.50 per week, and used him as handy man, stockkeeping, cutting pipe in shop, or driving the auto, this amount would be all gone, and more too. Or if you do the driving, or attending to horse or auto, both early in the mornings and late at night, then you are putting in extra hours over and above the regulation 44 per week, and simply using a five dollar a day man to do a $7.50-per-week boy's work.

Waste Material

Sixteenth, waste material such as broken pipe and fittings, lead traps that get badly mussed up, including lead waste ends, iron pipe ends, and numerous other channels of waste that we find hard to keep track of, so allowing $70

at the rate of 1 per cent. on a $7,000 material item will not be amiss.

Replacing Defective Goods

Seventeenth. Will you say $35 for replacing defective goods is out of the way, when for every 30 gallon range boiler that you instal, you invariably have to go back and replace it with another, at what cost to you? Figure it out for yourself. Why we should have to pay for the defects and shortcomings of ourselves and our men, but also for the manufacturer, jobber and supply man, is one of the drawbacks attached to our business that I have long since ceased to worry about. I could cite many other instances, but with me range boilers have always been the most troublesome.

Labor Lost

Eighteenth. For loss on labor, $230, being 5 per cent. on a $4,600 wage roll of a $15,000 business, does not seem to be out of the way from my viewpoint. You will all agree with me that on repair work you have men go back to make good, or for some reason they can not proceed with a job when arranged, all meaning loss of labor for which the business has to pay.

Again on contract work, having men on the job, without the material to go on with, either through the wholesaler not making the promised delivery, or the wrong article being shipped, necessitates waste time which is labor lost.

Allowance and Discounts

Nineteenth, $75 for allowances and discounts. I will revert back to my old friend, the range boiler, to substantiate my including this amount. We will say that our worthy friend, Tom Smyth, installs a 30 gallon boiler for Mrs. Jones, by the way this boiler was priced at a third on invoice cost, and after due time the account was rendered to the lady, when lo and behold she objects to the amount of the account, claiming that she can secure the boiler from the Gas Co. or maybe the departmental store for the same price as Tom has paid for it. Arguments are of no avail, the only resort left is to sue for the account or make an allowance to meet the lady's price. You would not sue, the amount would not warrant such action, you do the next best thing and allow the difference, this then is allowances. You render the account and to secure settlement you make an allowance or discount for cash, all of which is chargeable to overhead expense.

Interest on Capital

Twenty. What is capital? Where do you get the interest? and why $90? Capital is the amount you have invested in your stock, fixtures, accounts owing to you, and the cash on hand or in the bank, less the moneys owing by you for merchandise in connection with the business. Say you have $3,000 so tied up, could you not get 3 per cent. if you had it in a savings bank account? Then $90 is not out of the way.

Postage

Twenty-one, postage at $25 is I am sure little enough.

Stationery and Printing

Twenty-two. Stationery and printing, $36, including other office requirements, will not go very far according to my knowledge.

Society Fees and Trade Papers

Twenty-three, $20 for society fees, and $5 for trade papers should be added to cost of business, because the benefits accrued all go to assure the consumer of improved conditions in their sanitary and heating equipment.

Advertising

Twenty-four, $28 will not go very far for advertising, if one follows in the footsteps of our friend, Bob Shannon.

Our total for overhead items thus amounts to $3,932. Annual business amounted to $15,000. So that to find our percentage of overhead expense, we must divide the amount of overhead by the total business, which gives us an answer of 26 and 21-100 per cent., or in other words it costs this amount to carry on business before we consider profit.

In conclusion I do most earnestly desire that you will all, between now and our next meeting, go into the different items tabulated on the chart you have received, and compare them with those of your own business, then come prepared to state what should be the proper amount of overhead expenses chargeable in your own business. In this way we will be making a start, and, I promise, it will lead us to the goal we are striving to reach, or, in other words, will allow us to get at our profit.

Thanking you for your kind attention, and hoping that my efforts will be of benefit to every member of the association.

READ TRADE JOURNALS

By H. Addington Bruce.

You are anxious to get on in your chosen calling. You long for promotion. Perhaps, having lagged for some time, you are beginning to feel discouraged.

But are you doing all that you can to deserve success?

Are you, for one thing, making it a point to read and study some authoritative journal of the profession, business, or trade in which you are working?

All truly alert business men read trade journals as a matter of real necessity. They feel that it is impossible for them to continue progressing unless they keep abreast of the latest developments in their particular line of business as recorded in the journals they read.

You, let us suppose, are an electrician —a young, ambitious electrician.

Well, there are trade journals specially addressed to you. They are published in your interest, published for the express purpose of helping you to become skilful at the trade.

Do you read any of these journals?

Do you even know their names?

If you are a plumber, there are other journals of particular value to you as a plumber. Likewise if you are a hotel clerk, a bank clerk, a salesman, a hardware merchant, a dealer in china, a cigarmaker, or whatever else you may be.

For every vocation there are trade journals—some of them, of course, much better than others. And he is indeed a wise young man who early becomes a subscriber and constant reader of a good journal dealing with his trade.

He will learn from it how other men in the trade have won success. Almost every week he will glean from it something of direct helpfulness in winning success himself.

One week he will be specially enlightened by a leading editorial. Another he will profit most of all from a seemingly insignificant item of three or four lines, of peculiar interest to him because it chances to touch on a problem with which he is for the moment much concerned.

Or, tucked away in some letter in the trade journal's correspondence columns, he may come across an idea opening up to him new vistas of thought, perhaps a new avenue of opportunity.

Knowing these facts, I would say to any young man:

Read the newspapers. Read general magazines. Read good books. All of these are broadening.

But in addition read at least one good journal specially intended for men in your trade.

If leaders in the business world feel that they cannot afford to miss the reading of trade journals, can you afford it?

Catalogues and Booklets

W. H. Pearce & Co., 333 South Dearborn St., Chicago, are distributing a very well gotten up book describing the crescent system of modern heating.

It is a book of 60 pages, well illustrated with charts, drawings, etc., and in all contains some very interesting information for every heating engineer. These books can be procured by dropping a postal card to above address.

An Investigation of Pipe Corrosion

Above is the title of bulletin No. 3 now being issued by the A. M. Byers Company, Pittsburgh, Pa. It deals with something over 100 records procured as a result of an investigation in connection with wrought iron, steel and brass pipe when used for hot and cold water supply service pipes.

Every sanitary engineer in Canada will be interested in reading this bulletin because of the fact all have had experiences with the rusting of wrought iron pipes in service.

It might not be out of place to state that there is no mention of cast iron pipe in any way.

Many Businesses Wrecked by Details

Meeting To-day's Competition—Frank Stockdale, Merchandising Authority, Tells of the Problems of the Retailer and of the Dangers From Without and Within His Business That Face Him—The All-importance of Management.

"ONE of the earliest and most important problems with which every retailer is faced," stated Mr. Stockdale, "is a problem that is known as 'rising costs,' that is, the increased expense of conducting retail business as compared with conducting a business ten, fifteen, or twenty years ago." He stated that an investigation of 1,560 stores revealed the fact that the expense of conducting retail business had in the course of twenty years increased until now it was approximately double.

"In the last three or four years I don't know exactly where they have gone, but I know where they are going. Everyone knows what is happening now in the retail business and what is going to happen as long as conditions exist as they are. While the expenses of conducting retail business have doubled, I have yet to find one retailer who has been in business over a period that long, who has been able to increase his gross profit. If the expense of doing business twenty years ago was 12 per cent., to-day it is approximately 24 per cent. If the gross margin twenty years ago was 31 per cent., the man who could run his business on 12 per cent. had a net profit of 19 per cent. The same man to-day would have a gross profit of only 7 per cent. and in some cases the variation is wider. Some cases to-day there are in which only 3 per cent. profit is made where years ago it was 17 per cent. or 18 per cent. The net profit was six times as large 20 years ago as it is to-day.

"This is one of the fundamental points, and it has to be excavated carefully if the retailer hopes for success, consciously or unconsciously.

Cost of Doing Business Dependent on Cost of Living

"Do you realize that costs are rising more rapidly now than they have in the past?" said Mr. Stockdale, who stated as the reason that the cost of conducting a business in a retail store is parallel or based upon the cost of living.

"Whenever the cost of living goes up, the expenses of conducting a retail store go up, just as sure as night and day follow each other," added Mr. Stockdale.

Another fundamental principle was the evolution in the kind of stores, which Mr. Stockdale enumerated as follows:

(1) *The crossroads general store which is vanishing rapidly with the advent of automobiles, parcel post and good roads movements.*

(2) *Specialty stores such as hardware, grocery, etc.*

(3) *Department store (collection of specialty stores).*

(4) *Mail order house.*

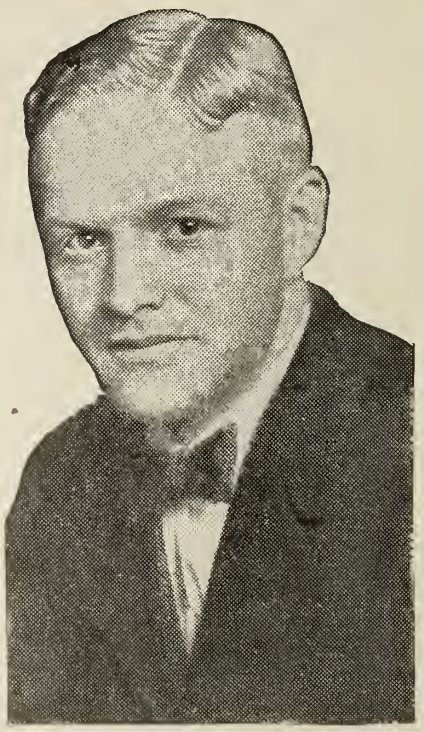
(5) *Chain store.*

EDITOR'S NOTE

The reason we have published this article is because so many of the members of the sanitary and heating engineering trade attended the course of lectures delivered by Mr. Stockdale in the Convocation Hall, Toronto.

We do know that very little, if any, mention is made of our particular trade, but feel that if there is one thing which sanitary and heating engineers lack it is the art of merchandising and all the science which salesmanship involves.

The first of these lectures, with the general title of "How to Meet To-day's Competition," is reproduced herewith. Some of the points raised are of vital import to merchants at all times, and even more so under the trying conditions at present existing.



FRANK STOCKDALE,
The Noted Retail Merchandising Expert.

Management the Great Item

"The stores that exist to-day and are making headway are stores that are managed," said Mr. Stockdale, "and their progress is the result of the brain work which is being put into them.

"People in department and chain stores and the men at the head are more alive for information and experience than is the man in the specialty store who manages the whole business himself. Men who run department stores recognize that management is the great thing, and they also recognize that the problem in the department store is to manage managers and to make good managers of the managers who are managed.

"To-day we are face to face with the problem of management. The thing that is holding the margin of profit down is the management of stores. My experience has taught me that management is the most acute of retail problems. A knowledge of how to sell, how to control, how to run a store in general, is the reason for the success and the growth of the various kinds of stores."

Mr. Stockdale pointed out that owing to abnormal circumstances an investigation of business should not be made on present conditions, but should be based on conditions which existed some time back. "If such an investigation is made" said Mr. Stockdale "you will get a clear vision that management is the real big factor in the market."

Three Types of Managers

Outlining three distinctive types of managers, Mr. Stockdale classed them as follows:

The fearful manager, who is fearful that the man he is directing will not do the job right, and who, therefore, loads himself down with details. This kind of manager, he said, could not delegate authority and did not usually get very far. The second type was the domineering manager who, he said, was not wanted where brain power was required, though he was all right where he supervised men who worked with their muscles. The third type, and the one who is getting the farthest, was the expectant manager, who sets a standard and lets others know that he is expecting them to come up to it, reward being on the basis of their attainments.

Mr. Stockdale added that the man who gave him the outline of the latter type of manager was a man who spent over one million dollars annually in advertising.

Referring to the pioneer method of laying roads along the calf paths through new country, Mr. Stockdale reminded the audience that to-day we have progressed beyond the calf path stage and had come to the scientifically laid roadway. This was true also in retail merchandising, we had developed beyond the calf path stage.

"We must remember this" said Mr. Stockdale, "that we must eventually come to the civil engineer stage, that the problems of retail merchandising must be figured out with the precision of an engineer's pencil and the sooner we recognize this the better we will be off.

"Many retail merchants are of the 'fearful manager' type, and get lost in the details of their business. The same thing applies to managers in department and chain stores. They forget to look at things in the right aspect. They lose sight of profits and when they do that their chance of success is lost."

Mr. Stockdale aptly illustrated his point with a story to the effect that a travelling salesman who had been calling upon a certain merchant for fifteen years stopped one day on entering the store and asked the merchant, standing with broom in hand, what he was doing at the same time fifteen years previous. The reminder that he had been doing the same operation for so many years brought a much needed awakening.

The Unwisdom of Doing the Work That Others Can Do As Well

"The same principle applies to all branches of business" said Mr. Stockdale. "Whenever you can hire a man to do a thing cheaper than you can do it yourself, and don't do it you are missing an opportunity for growth. There is no rule to allow a man to-day to do $12 a week work and reap $25 a week returns. It does not work out that way in this world.

"There is another thing every man in business must recognize. Unless he can delegate authority in these days of competition, he cannot hope to maintain his end of the competition struggle.

Driving home his point Mr. Stockdale bluntly put the question to the audience: "Are you the fireman or are you the engineer, the man who watches the signals or are you the man who shovels in the fuel and lets someone else do the directing?"

"Two things we must do in order to make our profits in spite of rising cost, in order to make our profits with the net profit so small, and one of the reasons why we must give so close attention is exemplified in the bigger stores. I know stores whose cost of doing business is 27 per cent. The net marking which is the gross profit is approximately 30 per cent. That store is making 3 per cent. net profit. In the old days there was 17 or 18 cents profit—the merchant could lose 6 cents and still have 12 cents, but what happens if the merchant to-day lost 6 cents? His 3 cents is on the other side of the ledger and it is whenever profits get small that we have to figure closely.

The Dangers of Waste and Lost Motion

"Two main things to look after are waste and lost motion. Waste which does not consist of any motion at all is the thing in business to-day. Waste in stores to-day is in the clerks that are doing nothing and that is small to the waste that is in the merchandise that is doing nothing. It is an easier problem to get the maximum efficiency from merchandise than from the clerk.

"The average merchandise stays on the shelf six months in the United States," said Mr. Stockdale, "which means two turns a year, taking stores of all sizes and kinds, and there we have one of the big and vital problems in merchandising.

"When net profits get down to 3 per cent., and lots of specialty stores run on 3 per cent., we are up against the real proposition in handling figures. The vital question is 'What is the profit on merchandising?' If I know where my profits are, I know where to put my efforts, and I know where my losses are. If I know how to compute my profit on an article, I know how to conduct that business. I know enough about that business to conduct it profitably. I can put my finger on the sore spots."

In conclusion, Mr. Stockdale pointed out that the foundation of all retail business is a knowledge of profits.

Linking up the main points of his line of argument as to how the retail merchant can meet competition to-day, Mr. Stockdale stated that the first thing laid down is that "we must get down past the stage of theories and work on principles. In the second place, the rising cost of doing business is complicated and made so intricate that we must give special attention to figures. In the face of to-day's competition we must recognize that management, real management that studies all phases of retail distribution, must have more of our time, no matter what size store we are running. We must get down to these two principles, i.e., to eliminate all waste in goods and help, and get away from guesswork and have absolute knowledge."

The discussion which followed the lecture brought forth many interesting questions, which were treated in a very satisfactory manner by Mr. Stockdale.

Answering a question in regard to the retailers' influence upon the "high cost of living," Mr. Stockdale replied that the retail merchant was least to blame for the high cost of living of any person in the world.

A merchant who had a competitor selling the same line of goods cheaper than he could afford to mark them, queried Mr. Stockdale as to the best procedure in such a case, which was evidently due to a lack of knowledge of the cost of doing business. The reply was that "if the competition was so great that I could not make any profit I would decide that I should be in some other business. Competition based on ignorance is the hardest to meet," added Mr. Stockdale, "and the merchants who are making the real success do not allow any person to set prices for them."

Mr. Stockdale set grocers as a class by themselves owing to the fact that so many entered the business with small capital and many left it in short time. On the other hand, he stated that some of the keenest merchants are retail grocers, but added that he did not know how to cure the merchant who is not aware of where his business stands. "This practice," said Mr. Stockdale, "is bad for himself and his competitors, and is bad for his customers, too, in the end."

A merchant in the audience, who had had previous experience with the same difficulty, made answer that in one case a number of merchants troubled with such a competitor paid him a personal visit and showed him the mistake he was making in selling at such a figure that it was plainly evident he lacked a knowledge of the cost of running his business.

"What in your opinion is the chief cause for failure among retail merchants?" was next asked.

Mr. Stockdale laid emphasis on management in making his reply. "The greatest source of failure to keep books, to know about the business, to look after the buying and the market, is because a man tries to look after too many small details." Mr. Stockdale added that only one thing was worse than the failure of a man to have at hand figure facts about his business, and that was to have figure facts that were not truthful.

In replying to a question re cutting prices on advertised and non-advertised lines, Mr. Stockdale stated that "the man who cut prices on advertised lines is usually a pretty wide-awake merchant."

"How about the man starting in business who has not reached the stage where he can live on 3 per cent. net profit?" was asked.

Mr. Stockdale's reply was that 50 per cent. of the retail merchants in the country were getting along without any net profit, their salary being included before a net profit is struck.

Mr. Stockdale was, in conclusion, asked to define profit. His answer was that profit "is the reward a merchant gets for doing an exceedingly difficult job a little better than the other fellow can do it."

WHY WATER PIPES BURST

When closing a water faucet a dull thud is frequently heard in the adjoining pipe, but few people give the matter any attention. This sound, however, has a decided significance, for it tells of a severe pressure and strain put upon the pipe, which is liable to be ruptured unless it is very strong. When a faucet is opened the water flowing through the pipe acquires a considerable momentum, and if the valve is closed suddenly this momentum reacts on the pipe, its force depending on the normal pressure and the speed with which the water flows. With a normal pressure of 125 pounds in the main, and only 20 pounds at the faucet, a pressure of 550 pounds has been encountered in the pipe immediately behind the faucet when the latter is suddenly closed, and the pressure in the main increased to 220 pounds. Under such conditions it is little wonder that the pipe bursts. This can be easily avoided if the faucet is closed slowly, thus gradually reducing the speed of flow in the pipe.—"Scientific American."

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MONTREAL TRADE TAKE NOTE

THE following letter which appeared in the Montreal *Daily Star* recently is very much to the point and should receive some attention by the Montreal craft:

WHAT ARE THE PLUMBERS DOING?

The Editor, Montreal Daily Star,

Sir—Realizing the great opportunity afforded by the press as a means of public education I send these few lines, hoping to gain some knowledge in the subject on which I write and on which our press has, from time to time, given editorials, viz., the proposed new by-laws on building construction for the city of Montreal.

The part that I am most interested in is that part pertaining to the sanitary arrangements in dwellings. Seeing the deplorable state of the plumbing work of this city, the first city of Canada and the city that should lead the way in such matters, and knowing that a more modern by-law well enforced by inspectors who know their business would remedy the present condition of affairs, I wish to know what have the master plumbers as a body or the journeymen plumbers as a body done to help remedy a state of affairs that is almost beyond description in the trade that they are pleased to boast of following? Have either of these bodies put any pressure upon the City Council to pass, without further waste of time, the new building by-law which has been before them for years? Do either of the departments of the plumbing trade understand the trust that is placed in them by the public? Are they not aware that it is for them to keep this city on a par, at least, with other cities in regards to sanitary matters? Are they really sanitarians or is it that they are in reality only in the business to bleed the public of their wealth, giving in return a mere sham of a sanitary service? I am closely associated with the sanitary industry, but I have not yet heard of any effort on the part of any sanitary body making an attempt to remedy the deplorable state found in the sanitary conveniences—which are almost mediaeval—of this the first city of the Dominion of Canada. Trusting that some interested person will join me in my earnest attempt to alter matters which I mention.

"INTERESTED."

SANITARY ENGINEER can at least partially answer the above letter. Some two years or so ago a number of Montreal sanitary engineers and the inspectors spent considerable valuable time in compiling a practical plumbing by-law that was proposed to be embodied as a part of the Montreal building by-law; but for no other reason but pure incapability on the part of the powers that be, the building by-law has no doubt been shelved.

SANITARY ENGINEER cannot see why a plumbing by-law should be a part of the building by-law. There are very few towns or cities in Canada that have these two matters under the building laws.

The fact of the matter is that building inspectors, architects, etc., have for many years tried to get their meddling fingers into the inspection of plumbing and have therefore, in some cases, assumed the responsibility of having plumbing construction and the law governing same put into building by-laws.

There is, however, no sane reason why a separate plumbing by-law should not be brought into force. We have good reason to know that such an ordinance is ready for acceptance by the Montreal council.

Our advice would be that the whole plumbing trade, employers and employees, should join hands and demand that a separate and practical by-law governing plumbing be at once put into force.

VALUE OF A MECHANIC'S ADVICE

THE following article from the November 1 issue of *Canadian Machinery* should be interesting to every reader of SANITARY ENGINEER. It voices the sentiment of this paper up to the hilt, when it asks the question, "What is the parallel between the two services rendered?"

SANITARY ENGINEER is pleased to learn from several sources that there are several sanitary and heating engineers that now charge (and rightly so) for their advice in matters that come within their sphere of knowledge. Here is the article referred to:

> What is the difference between professional and trade advice? If a man follows a profession, such as that of the lawyer or doctor, he invariably seeks remuneration for services rendered, and it is quite proper that he should do so, as this is undoubtedly the source of his livelihood; but what is the status of the man who works at a trade during the day and is requested in a casual interview with one of these professional men to advise him concerning some small matter pertaining to tradesman knowledge? While a machinist was paying a visit to a physician some time ago in connection with a slight physical

disability, the conversation turned to automobiles, with which the tradesman was quite familiar. As it turned out, the car owned by the doctor was not in the best of running condition. Before the patient left, the doctor knew considerably more about his motor than he did before the machinist called.

In the course of a few weeks the tradesman was confronted with a bill of several dollars for professional services rendered. What comparatively was the value of the "services rendered" to the doctor? If the machinist had put in a bill for his services, it is very unlikely that payment would have been made. The wage earner probably did not give a thought to receipt of payment for the advice he gave his physician; notwithstanding, the question still remains, what is the parallel between the two "services rendered?"

"Charge for your advice" is the slogan which SANITARY ENGINEER would advocate every member of the craft to adopt, and it would not take very long to make other men, particularly those in the professional line, to see eye to eye with us all.

THE VICTORY LOAN

THE Victory Loan at this time of the year should lead one to think very seriously because of the fact that very few people are looking forward to curtailing Christmas expenses. Stores and business houses are all preparing for a "Business as Usual" Christmas, which really should not be.

We have our boys at the front, fighting for us, sacrificing their hearts' blood, and doing it almost with the spirit of cheerful madness. How then can we at home feel justified in planning a festive season? We should mortgage, as it were, the money we expect to spend on our friends at home by taking that money and buying a bond of as big a denomination as possible. It is the bounden duty of everyone in Canada to do his utmost.

In the United States we have learned that it is quite common to see large signs over the doors of business places which read that "90 per cent. of our employees have subscribed to the Liberty Loan," and it should be the same here in Canada.

The Canadian Bankers' Association have made arrangements to advance 90 per cent. of the ready cash with which Victory Bonds may be procured and the money can be repaid in small sums spreading over a period of one year if necessary. This means that any person who feels that they can spare a small sum every month can procure from his bank just that amount of bonds, the bank holding the bonds as security until the money advanced is repaid.

We should bear in mind that every dollar loaned in this way is a nail in the coffin of Kaiserism. Every dollar is backed by Canada's resources, her timber, her gold, her water powers and every dollar of taxes. To subscribe to the Victory Loan is really loaning ourselves money and getting 5½ per cent. interest on the loan for so doing.

SANITARY ENGINEER knows no better way of investing money than this, and a large number of our advertisers are of the same opinoin as evidenced by the fact that they have placed their advertising space at the disposal of the committee that are working hard to make this Victory Loan a success.

Have You Bought a Victory Bond?

It's only like taking money out of one pocket and putting it into the other.

Don't let it ever be said that sanitary and heating engineers did not buy their quota of

VICTORY BONDS

Steam Traps, and How They Operate

Heating Engineers Will be Interested in This Series of Articles Which, After Describing Some of the Most Effective Radiator Traps, and the Tilt Trap, Will Deal With the Condensation Return Trap, Etc.

Strong Steam Trap

SIX sizes of this bucket type trap are built by the makers, the Strong, Carlisle & Hammond Co., Cleveland, O., and four sizes of valves and seats are obtainable which make the trap suited for: gravity 0 to 10 lbs.; low pressure 10 to 30 lbs.; standard pressure, 30 to 125 lbs.; high pressure, 125 to 200 lbs. Special attention has been given to the design of the bucket in view of the fact that the capacity of a steam trap depends entirely upon the size of the hole in its valve in relation to the pressure under which the trap works. As the permissible area of the hole depends entirely on the pulling force of the bucket mechanism, the importance of this feature is apparent. The particular design of bucket adopted is shown in Fig. 30. As soon as water enters the

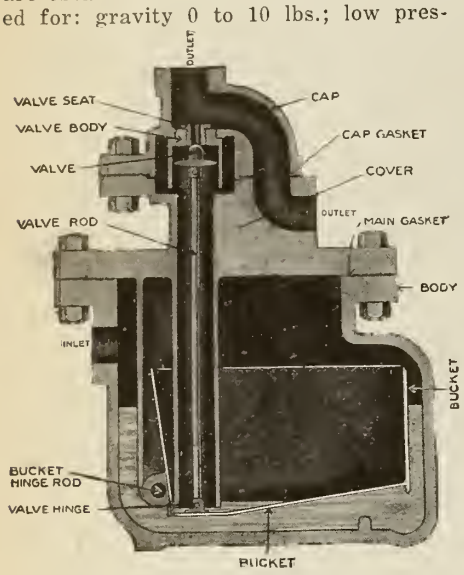


Fig. 30.

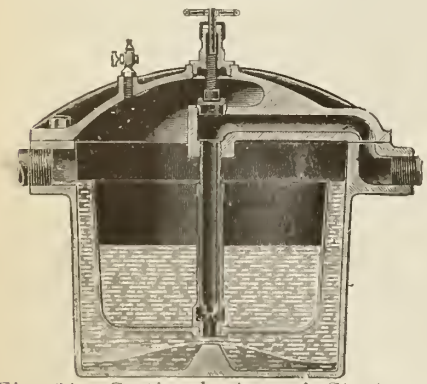


Fig. 31.—Sectional view of Sturtevant bucket trap with bypass.

trap, the bucket, being buoyant, floats and closes the valve, thus putting the trap in operation. As the amount of condensation collected by the trap increases, the water level rises until it overflows into the bucket, causing it to sink, pulling down the valve rod and opening the valve, whereupon the pressure of steam inside the body forces the water up the discharge pipe and through the valve to the outlet. The bucket having now regained its buoyancy, rises on the surrounding water and closes the valve, repeating the operation as described.

The design of the valve is such that the point is loosely attached to the stem, and on account of its shape forms a joint as soon as it touches the seat, regardless of its position. Being of the ball type, the valve simply comes up against its seat to close, and when lifted, gives a full opening, removing any danger of wire drawing.

This device is suitable for operation with steam heaters or radiators of any construction. As seen in the sectional view, Fig. 31, the body of the trap contains a pot, which, as the water flows through the inlet upon the left into space around the pot, rises and closes the connection between the interior and exterior. The water accumulates in this space and gradually overflows into the pot until its buoyancy is overcome and it sinks to the bottom. By this action free passage for water is afforded from the pot up through the vertical hollow extension of the cover and thence through the cored passage in the cover to the outer air. The pressure of the steam upon the surface of the water causes this discharge to be rapid, and it continues until the levity of the pot becomes sufficient to cause it to rise and prevent the passage of water by the seating of the extension against the cone screwed into the bottom of the pot.

Both extension and cone are of brass, and are ground to a fit, insuring a tight joint when in contact. The periodic delivery continues as long as there is water to discharge or sufficient steam pressure to cause the trap to act. When starting up, the valve at the top should be opened to allow a free discharge of air, water and steam from the heater. As soon as clear, and steam begins to be blown out, this valve should be closed and the trap allowed to act as already described. As some of the core sand from the heater sections often works into the trap when it is first set up, it is best to open it several times during the first week and give it a thorough cleaning. This is readily done by loosening up the bolts that hold the cover down, when cover and pot can be readily removed. These traps are built by the B. F. Sturtevant Co., Boston, Mass., and are obtainable in suitable construction for different pressures.

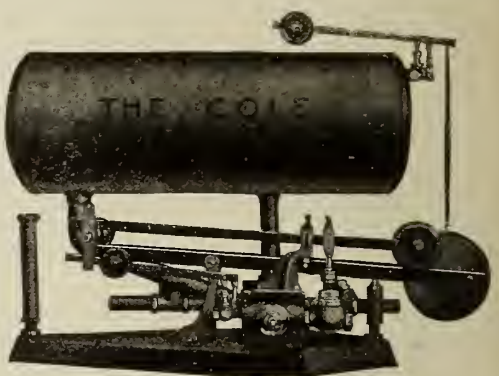


Fig. 32.—Cole automatic boiler feeder.

Where traps are handling water which can be used over again, the economy of returning it to the boiler with as little loss of heat as possible is widely recognized but not always carried out. Steam traps of the tilting tank type are well adapted for this service and in Fig. 32 is illustrated an automatic boiler feeder of this type, manufactured by the Geo. W. Cole Co., Toronto.

A feature of the construction is the method of packing the trunnion bearing on which the tank tilts. As shown in Fig. 33, the bronze trunnion is carried in a cast iron bearing, the packing between them being held in place by a gland, which is tightened by a set screw carried in a brass cap screwed into the cast iron bearing. By removing the cap and gland the bearing may be packed without disturbing any further connections. Seven sizes of this feeder are made, handling from 720 to 18,000 lbs. of water per hour.

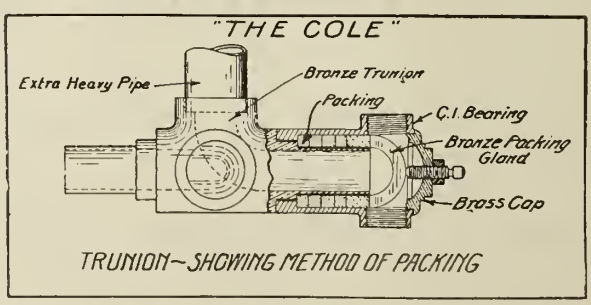


Fig. 33.—Method of packing trunnion in Cole traps

LETTERS TO THE EDITOR

Editor SANITARY ENGINEER,
Toronto.

Dear Sir:—I note with much interest the appearance, in recent issue of our trade journal, of detailed figures applying to "wrought versus cast iron pipe," in connection with the plumbing and drainage system in the Ottawa Houses of Parliament. These figures, on the surface, denote that pains and care have been used in their compilation. Now, as one protesting member of our trade, I would take steps to show the "powers that be" in Ottawa, who, I fear, are responsible, that it is in the general interests of all tax payers that skilled advice be secured by the Board of Works on plumbing and drainage from Canadian or British experts first, before they adopt the ideas of United States experts, especially in connection with a building of such national importance as our Federal Houses of Parliament.

The whole trouble seems to me that our public men and officials seem to be imbued with a desire to adopt "Americanized" ideas and methods instead of the surer and more firmly tried British methods.

There are parasites that infest the architectural profession on this side of the Atlantic who, while they may or may not be proficient in one particular branch, yet fail to consult other or more competent men for the various departments with which they are not acquainted, even when they must know in their own mind they are not experts in every branch of their profession. On the contrary, a British architect most learned in construction work, stresses, strains, etc., never hesitates to consult expert opinion on other important matters in which he himself may not be so well versed, such as heating, plumbing, ventilators, for instance. I myself have witnessed British architects don overalls to learn the most minute details of the various branches of the building trades, in order to become truly efficient men in their calling.

Let us all protest against the "Americanized" ideas that have unfortunately got such a foothold in the centre even of our own Canadian administration. This is not mere sentiment or prejudice. We of Canada must be British before we can build up Canada as a British nation. Let us then call for consistency among the officials in Ottawa. Let us insist on Canadian or British made goods and methods for the new "House"; for, believe me, there are the men and the goods in this grand old British Empire, that are capable of rivalling and even eclipsing anything our worthy cousins on the other side of the line ever contemplated.

Yours very truly,
S. P. SYKES.

The Life of Cast Iron Pipe

The Sanitary and Heating Engineer Will Find This Article of Particular Interest, Because of the Fact That the Experience Given Will Some Day be History.

American Experience

A reprint from the Engineering Supplement, Sept. 28, 1917.

The long life of cast-iron pipe is a matter of general knowledge, but some actual records of its use in water supply lines for railways which have recently been determined should prove of value to those concerned with water service installation. Instances of old installations of cast-iron pipe have recently been investigated on the Illinois Central Railroad, with the result that the life of several of these lines has been traced accurately down to the present time.

The most interesting case is that of a line of 4-in. pipe approximately 10,000 ft. long which was laid at Centralia, Ill., in 1855. In 1867 the pipe line became inadequate for the water consumption, and upon examination it was found to be heavily incrusted. Efforts were made to improve its capacity by cleaning it and relaying part of it with clean-out boxes at 100 ft. intervals. Only temporary relief was afforded, and in the following year about 5,000 ft. of the line were taken up and relaid with 8 in. pipe, which is still in service after being in the ground for 49 years. The 4-in. pipe removed at Centralia was relaid in 1868 or 1869 at Ramsey, Ill., and remained in service until 1903, when it again became too small for the demand and was replaced by 6-in. pipe. Since that time the old 4-in. pipe has been used as drains at a number of places.

Some of the 8-in. pipe laid at Centralia in 1868 was taken up when the shops were abandoned in 1916. It was found to be in such good condition that most of it was re-used, no distinction being made between the old pipe and new cast-iron pipe. Other examples of long life of cast-iron pipe on the Illinois Central include one of 7,500 ft. of 4-in. pipe at the Little Wabash River which was laid in 1857. This remained in service until July, 1893, when it was replaced by larger pipe. Some of the old pipe was relaid at Centralia in 1894 and 1895 and is still in service. No signs of paint can be found on the pipe at the present time and apparently it had never been painted. There is also a line of 3-in. pipe, 1,175 ft. long, which was laid at Correctionville, Iowa, in 1887 and is still in use, and a line of 4-in. pipe, 2,962 ft. long, which was laid at Webster City, Iowa, in 1869, a portion of which is still in use. A line of 4-in. pipe, 1,740 ft. long, laid at Cherokee, Iowa, in 1870, remained in service until 1900, when it was abandoned on account of a change in the water supply arrangements, and a 3-in. line, 606 ft. long, laid at Gaza, Iowa, in 1888, was abandoned in 1911 on account of the destruction of the water plant by fire.

Effect of Incrustation

The tendency of cast-iron pipe, in common with other types, to become more or less incrusted with the lapse of time, has no bearing on the life of the pipe, as it can be cleaned from time to time. In 1913 the Illinois Central experienced difficulty of this nature with an 8-in. line supplying water from the Big Muddy River at Carbondale, Ill. This pipe had become so incrusted that a pressure of 140 lb. per sq. in. was required at the pump to deliver 400 gallons a minute, which indicated that the capacity of the pipe was reduced to approximately that of a 5-in. pipe. Upon examination it was found that the diameter was reduced to about 7-in., involving a large increase in the friction factor as a result of increased roughness. A contract was let for cleaning the pipe under a guarantee that it would be restored to 95 per cent. of the discharge capacity of new pipe. The incrustations removed were estimated to represent about 16 tons of material, and the work was done without taking the station out of service for more than a few hours at a time and with no interruption to train service. When the cleaning was completed a test run on the pump gave a discharge of 498 gallons a minute for an average pressure of 70 lb. per sq. in.

The early cast-iron pipe is characterized by a bell that differs from the standard designs of the present time, by the presence of two reinforcing rings or enlargements at the third points of the pipe, and by inequality in thickness resulting from the practice of casting the pipe with the mould in a horizontal position. Measurements indicate an average thickness of about ¾ in. after 62 years of service as compared with a probable original thickness of shell of 7/16-in.

NEW PRICE LIST

The trade will be interested to know that a new pocket size price list is being issued by the Port Hope Sanitary Manufacturing Co., Toronto, of over 150 pages, well illustrated and containing a lot of other useful information. A postal card addressed to the Royal Bank building, Toronto, will procure one of these books

Coal Gas as Substitute for Gasoline

In the Old Days Members of the Craft Were Known as Plumbers, Gas Fitters, etc.—Some Have Taken up the Installation of Electrical Fixtures Without Having First Exhausted the Possibilities of Gas and Gas Appliances—Almost Every Industry Using Gas For Fuel.

AT NO time in the history of the trade were gas and gas appliances more popular and given such serious attention as is the case to-day.

Almost every industry has applied gas to some department or other. Gas water heaters for domestic purposes are being adapted to heat garages, by connecting same with a good sized radiator; the gas water heater being in some cases under thermostatic control in the basement of the house. Such an installation is almost the only really safe installation, certainly no naked lights are necessary and the expansion tank can be situated in the basement, or the whole installation can be connected direct to the pressure on the cold water supply system. The expansion tank however, is advisable.

Next we have all manner of industries using gas for steam generating. Glue kettles, preserving pans, retorts for the assayist, tool tempering and annealing, brazing, burning of lead, ice making machines, and a thousand and one other uses.

In our own line we have, on this continent, some of the most efficient hot water heaters in the world. The instantaneous gas water heater, was not long ago looked upon as some kind of a luxurious mystery, to-day there are thousands in use, and almost every better class residence has one installed. Hot water on tap is just as necessary as is cold water, and if the sanitary and heating trade will pay a little more attention to goods that are worth while, give a little more study to the science of salesmanship, and counsel the use of these lines that give real service, the public will very soon realize that we are out to serve in a big way. Of all men we should be the first to sell gas appliances.

Gas companies have been forced into the merchandising of gas appliances so as to increase the sale of gas, and there are now quite a number of gas fired hot water and steam furnaces.

We are told that in the city of Baltimore there are over 5000 gas fired hot water and steam heating systems in operation. In Cleveland there are quite a number and the trade are taking a splendid interest in these gas fired furnaces, why should it not be the same in Canada? There is no doubt but that these furnaces are coming, and coming sooner than many expect. It is up to the progressive sanitary and heating engineer to look into these gas fired appliances more than ever. Coal is at a premium, cannot be procured, is not half as flexible, and the concern who looks ahead will be acknowledged a forerunner in its line.

Do not let the gas companies have to begin and handle them so as to increase gas sales. Get into the game. Do not let the incompetent architect ride over your heads and specify the first new fangled idea that comes along as has been the case in the past. Get into the game, advocate what you know, and have proved to be the most practical, and stand by it.

As we have stated many, many times in SANITARY ENGINEER, gas is of all fuels the most flexible, is on hand morning, noon and night, from 12 a.m. Jan. 1st, to midnight Dec. 31.—365 days in the year. Why should we not devote a little more time to the selling and installing of all such appliances?

The plumber has murmured at inroads which gas companies have made in his business. Are the heating engineers to do the same, all for want of studying the new lines, and devoting a little time to the science of salesmanship? Let us sincerely hope not, but rather let us see heating engineers get after not only the gas, but also the oil-fuel fired furnaces.

Gas flexible? certainly, the following article taken from Commerce Reports will be of great interest to every car owner, and goes to show what is taking place in the old land in spite of the war:

"First-quality petrol is no longer obtainable for private automobiles in Edinburgh, and the price of second-quality is 71 to 78 cents per gallon. Substitutes on the market sell for 53 to 58 cents per gallon, and are far from satisfactory. Proprietors of lines of motor omnibuses in Scotland have been experimenting with city gas, and have found that with gas at 71 cents per 1,000 cu. ft. they effect a saving of approximately 50 per cent. in the cost of fuel.

"The gas is carried in a rubber-canvas bag on top of the omnibus. The connection with the engine is made through the induction pipe just above the throttle valve. Absolute combustion of the gas has not been attained, but it is believed that experience will soon overcome this difficulty.

"The only difference that can be detected in the running of the engine is that with gas slightly less power is developed. An Edinburgh company, which operates a large number of motor omnibuses, has been able to keep up to its time-table on the route on which trials have been made, which is one of the hilliest roads in the district. The double journey from Edinburgh to a town 15 miles out is accomplished on one filling of the holders, which have a capacity of about 800 cu. ft.

"Managers of corporation gas works are expecting a considerable expansion of their sales of gas as motor fuel. The market may become permanent in character, if inventors can provide rigid cylinders of a size and lightness suitable for commercial motors. It is thought that if satisfactory cylinders for gas can be provided this fuel may compete successfully even in normal times with petrol or gasoline."

Again, let us see what Vice-Consul Hamilton C. Claiborne, Bradford, Eng., in the Daily Consular Reports says:

"With the price of gasoline at 61 cents per gallon retail, numerous substitutes for furnishing vehicular motive power have appeared on the market. A development in the use of coal gas for automobiles has passed the experimental stage, a motor bus using coal gas having made the journey from London to Eastbourne and return, a total distance of 130 miles. The Grimsby municipality, which operates a system of motor-driven omnibuses to outlying districts, is said, after a trial extending over four months, to have effected a reduction in fuel cost per mile from 4.30d. to 1.66d., the price of gasoline being 61 cents per gallon and gas 61 cents per 1,000 cu. ft.

"The only change made in the motor is the fitting of a butterfly valve in the air-intake pipe for the regulation of the air supply, which allows the engine to draw the gas in the correct quantity, according to load and speed. It is claimed that an advantage accruing from the use of gas is that the engine is cleaner and the valves do not require grinding so often.

"In Yorkshire the use of coal gas for automobiles appears to be increasing rapidly. Recently Harrogate adopted it, and now Halifax and Hodmorden have decided to give it a trial. The necessary apparatus is relatively cheap and easily adjusted, consisting of a canvas bag with an inner layer of rubber, shaped like a mattress, which holds the gas drawn from the main and is strapped to the top of the motor omnibus or to the rear of the automobile. The gas in the bag is connected with the induction pipe, and the engine is worked by the suction

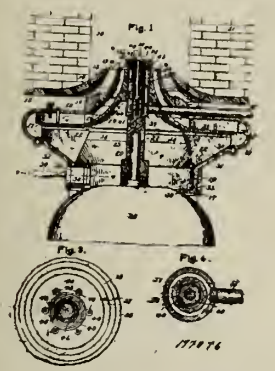
(Continued on page 32.)

New Canadian Patents

No. 177,076.

The S. T. Johnson Company, assignee of Jesse C. Johnson, both of San Francisco, California, U.S.A., 15th May, 1917; 6 years. Filed 21st March, 1917. Receipt No. 277,248.

Claim.—1. A burner comprising in combination, a motor having a projecting shaft, a burner casing mounted upon the said motor and having a tapered mouth, an axle secured to the shaft of the said motor and extending outwardly of the said mouth, an atomizer removably attached to the free end of the axle, an oil supply member having an outlet



No. 177,076. Oil Burner.

adjacent the said atomizer, and an air ejecting fan upon the said axle within the said casing.

2. A burner comprising in combination, a motor having a projecting shaft, a burner casing mounted upon the sail motor and having a tapered mouth, an axle secured to the shaft of the said motor and extending centrally outwardly of the said mouth, an atomizer removably attached to the free end of the said axle, a direction member within the said casing spaced from the upper portion thereof forming an air passage to the said mouth, an oil supply means and an air ejecting fan carried by the said axle inwardly of the said direction member.

3. A burner comprising in combination a motor having a projecting shaft, a burner casing mounted upon the said motor and having a tapered mouth, an axle secured to the shaft of the said motor and extending centrally outwardly of the sail mouth, an atomizer removably attached to the free end of the axle, a direction member within the said casing spaced from the upper portion thereof forming an air passage to the said mouth, an annular oil container centrally carried by the said direction member surrounding the said axle and having a contracted outlet within the said atomizer and mouth, and air ejecting fan blades carried by the said axle inwardly of the said direction member.

4. A burner comprising a hollow casing having an adjustable contracted mouth portion, a central axle within said casing, atomizing plates detachably carried by the said axle surrounding the outer end thereof at the mouth of the casing, a deflecting member interiorly carried by the said casing in spaced relation therewith and conforming to the upper portion thereof terminating adjacent the mouth of the casing, an oil feeding member carried by said deflecting member, and an air ejector within the said casing inwardly of the said deflecting member.

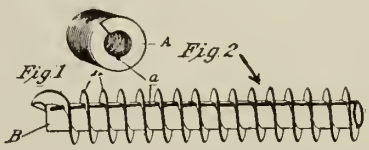
5. A burner comprising a hollow casing having an adjustable contracted mouth portion, a central axle within said casing, atomizing plates detachably carried by the said axle surrounding the outer end thereof at the mouth of the casing, a deflecting member interiorly carried by said casing in spaced relation therewith and conforming to the upper portion thereof terminating adjacent the mouth of the casing, an annular oil dispenser carried by the said deflecting member and having a contracted opening adjacent the said atomizing plates, and an air ejector within the said casing adjacent the inner free end of the deflecting member.

6. A burner comprising a casing having a contracted mouth, an atomizer composed of a plurality of plates, the said mouth being adapted to be adjusted vertically with relation to the said atomizer, an oil dispensing member opening adjacent the said atomizer, an air directing member between the said casing and oil dispensing member, fan blades within the said casing, and rotating means for the said blades and atomizer.

7. A device of the class described composing a dome having an opening therein, a burner casing having an adjustable mouth portion extending outwardly of the said opening, a revoluble atomizer positioned centrally of the said mouth, plurality of plates carried by said atomizer, and an air ejector for the said mouth arranged within the said casing.

No. 177,044.

George Webber Turney, Rome, New York, U.S.A., 15th May, 1917; 6 years.



No. 177,044. Radiator Tube.

Filed 10th April, 1916. Receipt No. 264,043.

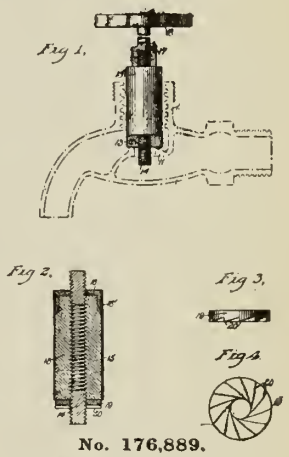
Claim.—A radiator tube provided with an external flange of flat resilient ribbon separately coiled edgewise, and having its several convolutions distended and secured in spaced relation along the tube.

No. 176,889.

Andrew C. Waltz, Port Arthur, Ontario, Canada, 8th May, 1917; 6 years. Filed 10th January, 1917. Receipt No. 274,159.

Claim.—1. The herein described valve seat grinder comprising a round body of abrasive material, a centering device projecting downwardly from the centre of the lower end thereof, a screw-threaded projection at the upper end thereof, a turning device connected to the threaded end aforesaid, and a reinforcing cap for the body between the turning device and the abrasive material.

2. In a valve seat grinder, the combination of a cylindrical body of abrasive material, a centre rod threaded from one end to the other and projecting axially



No. 176,889. Valve Seat Grinder.

through said body and projecting therefrom at the upper and the lower ends, metal reinforcing means protecting the abrasive body around its surface and at one end, and a turning device connected to one threaded end of the rod.

3. In a valve seat grinder, the combination of a cylinder body of abrasive material, a centre rod threaded from one end to the other and projecting axially through said body and projecting therefrom at the upper and lower ends, metal reinforcing means protecting the abrasive body around its curved surface and at one end, a turning device connected to one threaded end of the rod, and a metal cutter detachably connected to the other threaded end of the rod, substantially as set forth.

(Continued on page 29.)

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

MARKET interest during the past few days has centred around lead and lead products. Two declines have taken place in the price of lead pipe and lead waste pipe, and lead traps and bends have also been reduced in price. Caulking lead has joined in the downward swing, and wiping solder was lower in some quarters. Solder was quoted lower by some concerns, but firmness in the market was in evidence and at least one concern advanced prices. Pig lead in the primary market dropped to a low point, the price at one time having been cut in two from that prevailing six months ago. When the low point was reached a buying movement started which gave a turn upward to the market, and there has been a firm tendency since that time.

There is a strong situation in tin due to the scarcity of spot stocks on this continent and the inability of importers to get their shipments through from London. Permits for transportation have been held up for some time. The condition in the tin market is having an effect toward firmness in the market for solder.

Manufacturers of range boilers are finding their operations restricted through the embargo of the United States on black steel sheets of one-eighth inch and thicker. These heavy sheets entered into the boiler in the ends and restriction of use is having its effect on the number available. Black sheets and galvanized sheets have shown a downward tendency as the result of establishment of fixed prices in the United States. Trade for the most part is reported fairly good by reason of the finishing of buildings that have been under way for some time.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917.

Standard Buttweld.

	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 5 00	$ 6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld.		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES.

4" and under, 45%.
4" and under, running thread, 25%.
4½" and larger, 40%.

STANDARD COUPLINGS.

4" and under, 35%.
4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces.

TORONTO, Nov. 13.—There is quite generally a feeling of satisfaction over the fair amount of business that is being done in plumbing lines. Structures that have been under way for some time are now being completed and this has caused a seasonably good demand. Industrial conditions in the mining districts of Northern Ontario have been good and this has occasioned a good demand for enamelware and other lines. Manufacturers of range boilers are having difficulty in getting the heavier gauges of black sheets as the embargo placed on their shipment by the United States Government has been an effectual bar to the arrival of further supplies in this market. Changes in lead and tin products have been of more than usual interest.

Operations of Boiler Manufacturers Restricted

RANGE BOILERS.—Manufacturers of range boilers are finding themselves in a difficult position to get heavier sheets for the manufacture of their products. Due to the operation of the embargo from the United States on sheets of one-eighth inch and thicker, no further supplies of this material can be brought forward. The heavier gauges of sheets were formerly used in the ends of the boilers. Where it can be shown that the range boilers are to be for military uses it is still permissible to bring the heavier sheets into Canada. For the domestic trade it would seem that the manufacture will be restricted unless lighter sheets can be utilized in the making of the ends. Prices remained unchanged since last issue with a fair demand reported.

	Standard	Extra Heavy
30-gallon range boilers....	$13.00	$17.00
35-gallon	17.00	20.50
40-gallon	20.50	24.00
52-gallon	28.00	32.00

Premium on Larger Sizes of Wrought Pipe

WROUGHT PIPE.—With the dwindling of supplies of the larger sizes of pipe, prices have become largely nominal for 4-inch and upward. Although the list prices remain unchanged, it is understood that holders of pipe are in some cases asking higher prices due to the light stocks now available of this class of pipe. Manufacturers are unable to get the materials for the heavier sizes by reason of the fact that rolling mills in the United States are turning their energies to the manufacture of ship-plate. New business on pipe is somewhat light in volume but manufacturers are still busy on back orders held up by reason of delayed shipments of raw materials.

Call for Enamelware From North Is Good

ENAMELWARE.—Manufacturers of enamelware in some instances report the demand for enamelware from the mining districts of the North has been good of late and that fairly good quantities are being shipped into that territory. With good industrial conditions as a result of the prosperity of the mining industry, people have felt more inclined than ever to have more comforts in their homes. In the older sections of the province there has been a fair movement of enamelware for completion of work under way for some time. Prices remained unchanged.

Bath-tubs, roll rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bath-tubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple.....	16 80
Closets, oak tank and seat	22 00
Do., enamel iron or white vitro tank...	23 75

Soil Pipe and Fittings Unchanged

SOIL PIPE, FITTINGS.—There was quietness in the market for soil pipe and fittings during the time since last issue so far as price changes are concerned. Demand is fair and prices are unchanged.

SOIL PIPE FITTINGS.		
Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%
C. I. PIPE FITTINGS.		
Cast iron fittings	....	15%
Cast elbows, tees, etc.	....	15%
Plugs	....	30%
Bushings	30%	33%
Flange unions, standard	....	20%
Dart unions, ¼-inch to 2-inch	20%	25%
Do., 4½ in. and larger	....	15%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4-in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.	Black	Galv.
Malleable Fittings, Class A, lb.	0 50	0 63
Do., Class B, lb. net	0 22	0 33
Do., Class C, lb. net	0 15	0 22

Valve Manufacturers Continue to be Jubilant

VALVES.—There is no cessation in business apparent in the manufacture of valves and manufacturers continue to be gratified over the way their plants are kept running to capacity. Prices held firm without change, the only recent change being in brass steam cocks, as recorded in last report.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard.	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	Net
Globe, angle and check valves, standard.	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Plumbers' Oakum Held Unchanged

OAKUM.—Market quotations on the various kinds of oakum remained unchanged since last report. There is a lighter demand, which is having its effect toward steadiness in price.

		Per 100 lbs.
Best American	....	$21.50
U.S. Navy unspun	....	20.75
Plumbers' spun	$8.50	10.00

Traps And Bends Down; Solder Makes Advance

LEAD AND ZINC PRODUCTS.—Lead pipe and lead waste pipe have declined 2c per pound. A decline was also registered in the price of lead traps and bends through the changing of the discount, making the selling price now 10 per cent. on list instead of 20 per cent. on list as formerly. This decline is due to the recent decline in pig lead. In solder, however, there has been an upward swing in price on the part of some concerns, due to the firm position in tin, in which big advances were recorded during the week. In the local market tin advanced 10c per pound in some quarters. Guaranteed solder is now quoted up to 39c per pound, an advance of 1½c; strictly half-and-half is quoted up to 37¼c, an advance of 2¼c; commercial is quoted up to 36c, an advance of 3¾c; wiping solder at an advance of 2¼c, making the high quotation now 37c. Solder wire remains unchanged at 45c per pound. There is a great scarcity of tin on the primary market in New York and prices advanced sharply in that quarter.

Lead pipe, lb.	$ 0 15	....
Lead waste pipe, lb.	0 16	....
Lead traps and bends	10% on list	
Lead wool, lb.	0 15¼	0 17
Lead, caulking, lb.	0 85	0 10
Lead sheets, 3 lbs. sq. ft.	0 14¾	0 15½
Lead sheets, 3½ lbs. sq. ft.	0 14¾	0 15½
Lead sheets, 4 to 6 lbs. sq. ft.	0 14½	0 15
Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 37½	0 39
Solder, strictly, lb.	0 33.7	0 37¼
Solder, commercial, lb.	0 36	0 38½
Solder, wiping, lb.	0 30.5	0 37
Solder, wire, lb.	....	0 41
Zinc sheets, per lb.	0 26	....

Black And Galvanized Sheets Again Weaker

SHEETS, PLATES.—There was a weaker tendency manifested in black and galvanized sheets during the week when further reductions were recorded in the case of black sheets, amounting to $1 on certain gauges, and 50c per 100 pounds on other gauges. While there are lower prices being quoted, as will be noted by observing the range given in quotations below, the following prices represent a decline from higher levels of the amount indicated above: No. 14 gauge, $10.65; No. 16 gauge, $10.75, in these two gauges the decline amounting to 50c. In the following gauges the decrease amounts to $1 per 100 pounds; Nos. 18-20, $9.30; Nos. 22-24, $9.35; No. 26, $9.40; No. 28, $9.50. Heavier sizes of steel plate remain unchanged, as there is a scarcity due to the requirements for shipbuilding. On galvanized sheets there was a decline of $1 per 100 pounds in certain quarters, which now makes the following prices prevail: 10¾ oz., $10.25; No. 28, $9.95; No. 26, $9.65; Nos. 22 and 24, $9.50; Nos. 18 and 20, $9.35; No. 16, $9.20; No. 14, $9.10. Declines were attributed to the establishment of fixed prices in the United States markets of $4.25 to $6.25 for sheets.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$.....	$12 00
12 gauge	10 05	11 00
14 gauge	9 95	11 15
16 gauge	10 00	11 25
18-20 gauge	8 80	10 30
22-24 gauge	8 85	10 35
26 gauge	8 90	10 40
28 gauge	9 00	10 50
29 gauge	9 10	.....
3-16 inch plate	....	13 25
¼-inch boiler plate	....	13 00
GALVANIZED SHEETS—	**Per 100 lbs.**	
10¾ oz.	11 25	12 00
U.S. 28	10 95	11 70
U.S. 26	10 65	11 40
22 and 24	10 50	11 25
18 and 20	10 35	11 10
16	10 20	10 95
14	10 10	10 85

Corrugated Sheets Unchanged, But Weak

CORRUGATED SHEETS.—Although there was no change in the market for corrugated sheets, there was a weaker tone, due to the establishment of fixed prices on sheets in the United States market. It is intimated that the effect might not be felt immediately, but as soon as new stocks begin to reach this market, probably about the first of the New Year, there may be some definite movement locally with respect to prices. Demand is light at present. Conductor pipe and eavetrough remain unchanged at discount of 10 per cent. off list.

	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$8.70-$9.20	$ 7.20
No. 26 gauge	9.60-10.00	....

Old Materials Take Big Slump In Price

OLD MATERIALS.—With the possibility that prices on old materials are to be regulated by the United States Government, something in the nature of a bomb was thrown, which scattered the prices of old materials in a downward direction. Tea lead declined 2½c per pound to present quotation of dealers at 4c. Heavy lead pipe was down 2¾c per pound, the quotation now being made is 5½c. Yellow brass declined 1c per pound, and is now quoted at 12c to 13c per pound, while red brass is down 1c at 19c per pound. Light brass declined ½c to 1c, and is now quoted at 9c as the price being paid by wholesale dealers. Heavy zinc declined ¼c to ½c per pound, and is now quoted at 5½c to 6c. There is very little selling on the part of collectors at the present time, as wholesale dealers are showing a disposition to let up on buying.

Tea lead	$ 0 06½	....
Heavy lead pipe	0 08¼	....
Yellow brass	0 13	0 14
Red brass	0 20	....
Light brass	0 09½	0 10
Heavy zinc	0 06	0 06¼
Heavy copper	0 20	0 21
Stove plate, per ton	17 00	18 00

Can Only Bring Forward Boiler Tubes As Needed

BOILER TUBES.—A reversal of the situation in boiler tubes was made during the week, due to arrangements with authorities at Ottawa. Until a few weeks ago an embargo placed by the United States Government permitted these goods to come forward only on license. Some local concerns had succeeded in getting permits to bring forward some supplies in carload lots. Before these stocks have had the opportunity to arrive, this decision has been superseded by a ruling which permits tubes to come forward only on application for each particular piece of work. The merits of each case, in other words, must be the deciding factor. From this it would seem that stocks will not be shut out of this market entirely, but will be permitted to come forward when dealers show that they have a good and sufficient reason for bringing them forward. In the meantime stocks now being held by dealers are getting low. Prices, however, remained unchanged.

(Continued on page 32.)



GOSSIP OF THE TRADE

FIRE LOSSES

The Cluff Munition Co. shell forging plant, Atlantic avenue, Toronto, suffered a fire loss of between $200,000 to $300,000 Nov. 3, which we understand was covered by insurance. The plant is being rebuilt and splendid work has already been done in clearing away the debris.

It is expected that the plant will be turning out forgings by about the beginning of December.

Ontario Wind Engine and Pump Co. Also Suffered

The Ontario Wind Engine & Pump Co. also suffered in the conflagration referred to above, when their stables, garage, and silo plant, together with four valuable horses, automobile and a large stock of manufactured silo material were destroyed. The total loss is estimated at about $5,000.

BANQUETS A HERO AT FORT WILLIAM

Private W. Millar, of the 52nd battalion, who recently returned to the city, and who was formerly a member of the firm of Millar and Silk, master plumbers, Fort William, was banqueted Oct. 29, by the master plumbers' association of Fort William. The banquet was held in the Ray-Street block, Simpson street, and twelve master plumbers sat down, with J. J. Culliton in the chair, and Private Millar entertained the company to a very interesting talk on his experiences in the war, and gave a vivid account of many personal incidents which were striking and original. A gramophone, kindly loaned by Mason and Risch, provided a splendid program of music and S. McNamara, plumbing inspector, who was the guest of the association, responded to a toast with his usual skill.

TO TRAIN VETERANS IN SANITARY WORK

The Soldiers' Aid Commission and the Ontario Department of Health have undertaken an important work in connection with returned soldiers. It is proposed to launch a three months' course to fit those who wish to take it for positions as sanitary inspectors. The co-operation of towns and cities throughout the Province will be asked so that the returned men who take the course will be given these positions when they become vacant.

THE FATE OF THE PRICE CUTTER.

He studied the word, and then said he:
"Let the ax be laid at the foot of the tree."

And the tree, by chance, was his own good plant;
But he made a hit at the proper slant.

And the chips fell far, as such chips do,
And some struck me and some struck you.

But the thrifty plant, once fair to see,
Lies low in the land of the "Used to be."

And the cutter—he of the sturdy whacks,
Who swung the blade of the gleaming ax—

Where is he now, who hewed his way?
You only shake your head and say:

"Under the grass and silent dew,
We buried him after the job was through."

And the marble reads in Gothic free,
"The ax is laid at the foot of the tree."

—Author Unknown.

The course will consist of a series of lectures to be delivered by experts in the different branches of the work.

Twenty will be delivered by Col. J. W. S. McCullough, Dr. Hastings and Major Fitzgerald, on the Public Health Act, its regulations and the duties of a sanitary inspector. They will also deal with the Municipal Act in its relation to sewerage water and garbage regulations.

There will be twenty lectures on the identification of reportable contagious diseases by Dr. White, of the Isolation Hospital.

Experts to Give Lectures

Dr. Defries, anti-toxin expert of the University of Toronto, will deliver ten lectures on the control of outbreaks, and Dr. Fitzgerald will deliver five lectures on the administration of anti-toxin. Mr. Lancaster, chemist of the Provincial Health Department, is slated for five lectures on the collection of samples for laboratory work. The protection of water supply sources will be treated by Engineer Dallyn, of the Health Department.

Others will be "Purification of Sewerage," by A. V. Delaporte; "Plumbing Inspection," by city plumbing experts; "Protection of Milk," Dr. Hastings, Dr. Nasmith and Dr. Lloyd; "Inspection of Food Offered for Sale and in Cold Storage," Dr. McCullough; "Control of Flies and Mosquitoes," Dr. Walker; "Rabies," Dr. Naylor; "Venereal Diseases," Dr. Gordon Bates and Mr. C. H. Ware; "Vital Statistics," Registrar Manchester, of the Ontario Department. There will be other lectures on many other minor phases of the work.



J. R. DULANY

Of Chamberlain Co., Pittsburgh, was a visitor in Toronto this week, making arrangements to establish a factory here.

RIGID ECONOMY IN METAL URGED

THE situation in regard to iron and steel supplies remains serious. Rigid economy in every scrap of metal is strongly urged as the result of a visit which F. C. T. O'Hara, Deputy Minister of Trade and Commerce, has paid to Washington. Some misunderstandings have been cleared up in respect of procedure in the handling both of export license applications and applications for priority assistance. Arrangements have been made, which it is greatly hoped will assist the Canadian manufacturer to secure articles he needs from the United States.

It is pointed out in Ottawa, however, that demand in the United States is abnormal. There is even a likelihood that a number of Canadian manufacturers will have to face sacrifice in the future for the reason it is not possible for the United States to supply many materials required for commercial purposes in Canada. Further, there is reason to believe that there will be a scarcity in materials required in Canada for the manufacture of articles which might properly be regarded

as articles contributory to the war. It is felt that the situation can only be met by the strictest economy in the use of metals.

Arrangements have been reached with Washington whereby all articles now requiring priority shall first be covered by a priority application made by the United States shipper. Such priority application must be forwarded to the department of trade and commerce, Ottawa. The department of trade and commerce upon investigation as to the need and urgency of the article in Canada will recommend such priority as it can, based on the scheme laid down by Judge Lovett, chairman of the priorities committee.

It has been arranged to have an officer of the British embassy in Washington detailed to follow up with the export license bureau applications for export licenses which have been endorsed by the department of trade and commerce.

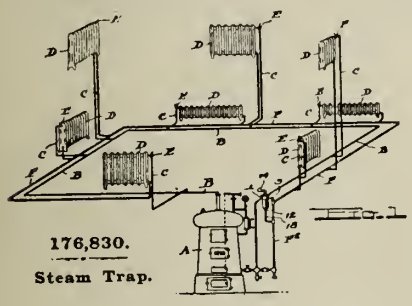
A committee of prominent iron and steel men is now investigating the iron and steel situation in Canada.

New Canadian Patents

No. 176,830.

John Augustus Holmberg, Lindsborg, Kansas, U.S.A., 8th May, 1917, 6 years. Filed 2nd March, 1917. Receipt No. 276,431.

Claim.—1. In a combined air ejector and steam trap for vapour heating systems, a casing having an air discharge opening, a water outlet and a fluid inlet, a float normally closing said water outlet, a normally open valve for said air discharge carried by said float, and a thermostat arranged between said valve and float operable by the entrance of steam



176,830.
Steam Trap.

into said casing for closing the valve and firmly seating the float to maintain it in position for closing said outlet.

2. In a combined air ejector and steam trap for vapour heating systems, a casing having an air discharge opening, a water outlet, a float normally closing said water outlet, a normally open valve for said air discharge carried by said float, and a thermostat arranged between said valve and float, said casing having a fluid inlet opening tangentially through one side wall opposite said thermostat whereby the steam entering through said inlet will immediately impinge on said thermostat and close said air discharge valve.

3. In a device of the class described, a cylinder casing having closures at its ends provided with centrally disposed apertures constituting an air discharge and a water outlet respectively, an inverted cup-shaped float disposed in said casing and surrounding said outlet, a thermostat carried by the closed end of said float on its outer face, a normally open valve for closing said air discharge carried by the same thermostat and a guide stem on said valve extending through said air discharge, said casing having a tangentially disposed inlet opening in its side wall at a point above said float opposite said thermostat.

4. In a device of the class described, a cylindrical casing having closures at its ends provided with centrally disposed apertures constituting an air discharge and water outlet respectively, an inverted cup-shaped float disposed in said casing, a combined guide and perforated support for said float disposed within the float and corresponding in shape thereto and of slightly smaller size, said support having an outwardly extending annular flange on its open end resting on the end of said casing outside the water outlet, the edge of said flange engaging the side walls of the casing, said flange forming means for spacing said support from said side walls and for holding it against lateral movement, the edge of the open end of said float resting normally on the flange of said support.

No. 177,176.

Michael J. McHale, Scranton, Pennsylvania, U.S.A., 22nd May, 1917; 6 years. Filed 2nd April, 1917. Receipt No. 277,894.

Claim.—1. An adjustable roof flange comprising a base, a cover movable on said base, and resilient means for removably securing said cover in position.

2. An adjustable roof flange comprising a base, a concavo-convex shaped cover movable on said base, and resilient means for removably securing said cover in position.

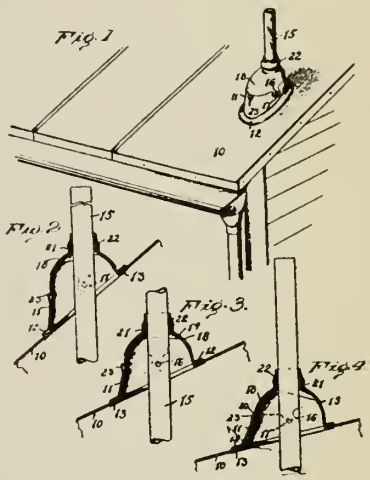
3. An adjustable roof flange comprising a base, a reversible cover movable on said base, and resilient means for removably securing said cover in either of its positions of operation.

4. An adjustable roof flange comprising a base, a reversible cover movable on said base, said cover having its wall concave-convex in form and provided with an opening disposed at one side of the centre thereof, and resilient means for removably securing said cover in either of its positions of operation.

5. An adjustable roof flange comprising a base, a reversible cover movable on said base, said base having its wall concavo-convex in form and provided with an opening disposed at one side of the centre thereof, oppositely disposed lugs carried by said base, and resilient ears formed with said cover and adapted to be snapped into engagement with said lugs for pivotably retaining said cover in either of its operative positions.

6. An adjustable roof flange comprising a base, a reversible cover movable on said base, said cover having its wall concavo-convex in form and provided with a flanged opening disposed at one side of the centre thereof, a gasket carried by the flanged wall of said opening, oppositely disposed lugs carried by said base, and resilient ears formed with said cover and adapted to be snapped into engagement with said lugs for pivotally retaining said cover in either of its operative positions.

7. An adjustable roof flange comprising a base, a reversible cover movable on said base, said cover having its wall concavo-convex in form and provided with an opening at one side of the centre thereof, a flange surrounding said opening, a gasket carried by said flange and having its inner wall flush with the exposed portion of the inner wall of said flange, oppositely disposed lugs carried by said base, and resilient ears formed with said cover and adapted to be snapped into engagement with said lugs for pivotally retaining said cover in either of its operative positions.



No. 177,176. Roof Flange.

Prolonging the War

Two English workmen were discussing the war.

"It'll be an awful long job, Sam," said one.

"It will," replied the other.

"You see, these Germans is takin' thousands and thousands of Russian prisoners, and the Russians is takin' thousands and thousands of German prisoners. If it keeps on, all the Russians will be in Germany and all the Germans in Russia. And then they'll start all over again, fightin' to get back to their 'omes."—Tit-Bits.



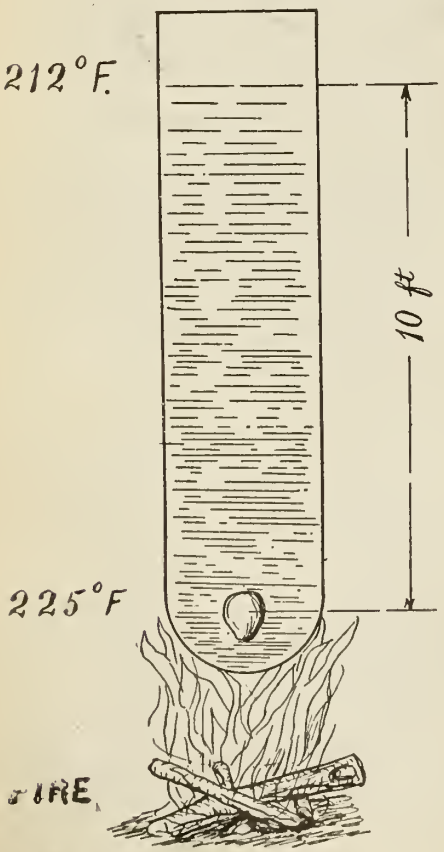
Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHAT IS THE TEMPERATURE OF A STEAM BUBBLE?

By N. G. Near.

IT is generally assumed that the temperature of the water in a steam boiler is practically uniform from top to bottom, but it occurs to the writer that in some of our modern boilers there may be a considerable difference, especially in the steam temperature.

It is often explained that in the generation of steam, small steam bubbles form at the bottom of the boiler, whether tubes or shell, and that these bubbles then shoot upwards because of their low density. However, according to steam tables, the temperature of a steam bubble at the bottom of a large boiler must be sometimes as much as 20 deg. F. higher than the temperature of the steam in the steam chamber.



ILLUSTRATING REMARKS ON TEMPERATURE OF STEAM BUBBLE.

Take the example shown herewith—a vertical tube holding 10 feet of water. The water pressure at the bottom is 4.34 pounds per sq. in., or 19 lbs. absolute. The temperature of steam under such a pressure must be at least 225 deg. F. The top of this tube being open to the atmosphere, the temperature of the steam escaping would therefore be 212 deg. F. at sea level. Hence we have a difference in steam temperature of 13 deg. F. The small round object drawn at the bottom of the tube is a "steam bubble."

ONE OF THE MANY TESTIMONIALS RECEIVED BY SANITARY ENGINEER

Victoria, B.C.,
Oct. 25, 1917.

Sanitary Engineer,
Toronto.

Gentlemen:—

Enclosed please find a renewal of my subscription to your valuable paper. After three years' subscription I can honestly say that I enjoy your timely talks on the various affairs of interest not only to our craft, but to every one who is a believer in improving the existing sanitary conditions of our cities and to the general uplift of the plumbing and heating trades throughout the whole of the Dominion. Carry on the fight. I am,

Sincerely,

You can print this if you wish. J. C. HOCKING.

In Lighter Vein

"If you go first, dear, you'll wait for me on the other shore, won't you?" questioned the fond wife. "I suppose so, returned her husband, with a sigh. "I never went anywhere yet without having to wait for you."

"Women have very little sense of humour," said the cold-blooded citizen. "I don't know about that. Henrietta can see a joke as quickly as anybody. Every time the children talk about wanting to grow up to be smart and industrious like their father she laughs."

Rector (after exposition of Sunday school lesson to infant class)—"Now' would any little boy or girl like to ask me a question?" A Terrible Infant—"Have you got on trousers under that nightgown?"

At a munitions-canteen a workman had called for a cup of coffee. Half a minute after receiving it he was back at the counter. "There's something funny about this coffee, miss," he said, "it tastes just like cocoa." The waitress sipped it and apologised. "I'm so sorry," she said, "I've given you tea."

Private Jimson was relating his experiences of the war. He said he was once taken prisoner and the enemy stripped him of all his clothing.

"Did you feel the cold much?" asked a friend.

"No," replied Jimson, "not at all. You see, they carefully covered me with their rifles."

Sandy and John were sitting in a 'bus, when a pretty girl got in and smiled at the former. He raised his hat.

"Do you know her?" asked the Englishman.

"Oh, yes, very well," the Scot replied.

"Well, shall we go and sit over beside her, and then you can introduce me?" asked his companion.

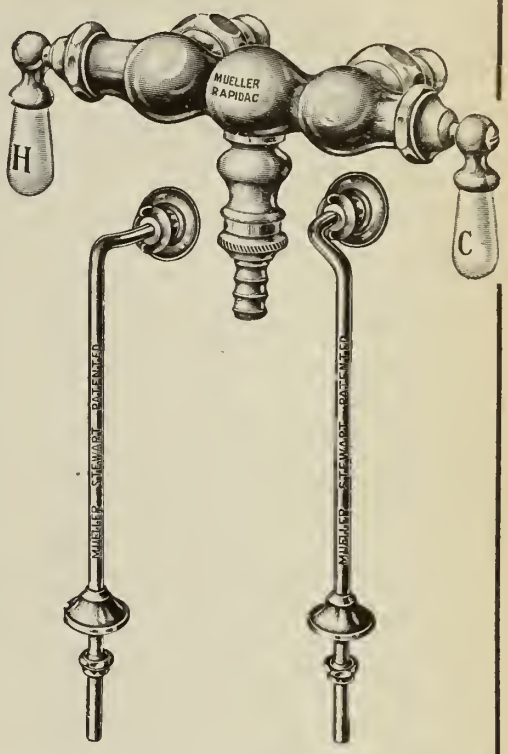
"Wait a bit," returned the canny Scot, "She hasn't paid her fare yet."

Quality makes the most Sales

In nine cases out of ten it's quality that closes the sale of plumbing fixtures. You discuss price, and terms, and how long it's going to take to complete the installation—but finally you come back to quality. It's what you are able to tell of the quality of your goods that holds the interest of your prospect and finally leads him to buy.

When you "talk quality" on a "Mueller Rapidac" Fixture you have a perfectly made, beautifully finished object that compels belief in the truth of your claims. Your prospect can see for himself that unusual care has been taken in its manufacture, consequently he will the more readily believe what you say about the things he can't see.

And then, when the sale is made, and the installation completed, there's a fixture that for years speaks volumes for your business integrity and ability.



Fuller in Design
Compression in Action

It's a

MUELLER
Rapidac

H. Mueller Mfg. Company, Limited

SARNIA :: :: ONTARIO

Makers of High-Grade Water, Plumbing and Gas Brass Goods and Jobbers of General Plumbing Supplies

MARKET CONDITIONS AND TENDENCIES

(Continued from page 27.)

Toronto—	Per 100 feet Cold drawn	Lapweld
1 inch	$36 00	$ ....
1¼ inch	40 00	....
1½ inch	43 00	36 00
1¾ inch	43 00	36 00
2 inch	50 00	36 00
2¼ inch	53 00	38 50
2½ inch	55 00	42 00
3 inch	64 00	50 00
3¼ inch	....	58 00
3½ inch	77 00	60 00
4 inch	90 00	75 00

Tin Shortage Acute; Prices Jump Upward

COPPER.—There was a disposition to mark time in the copper market during the week. The situation in the United States is one of stagnation owing to the fact that the producers have no further supplies of copper to offer at 23.50c, the established price, for at least the balance of the year, and the wholesalers have not cared to sell. The latter want higher prices, but the Government has made it plain that to sell at a higher price than 23.50c would incur its wrath. Locally prices held at 32c for casting and 33c for electrolytic.

TIN.—There was a very active market in tin during the week and prices went up 10c per lb. in one quarter, quotations being made on the basis of 75c per pound. There is an acute shortage of tin in the New York market owing to the inability to get shipments through from London. The British Government is holding up consignments through the failure to give permits for their shipments. Prices locally ranged from 65c to 75c pound.

SPELTER.—There is a continuance of the easy feeling in the spelter market, induced by the fact that production of spelter has been larger than current needs. The producers' margin has been cut, and there is talk of closing some smelting furnaces in order to curtail output. Locally prices held unchanged at 10c per pound.

LEAD.—There was a much stronger feeling in the market for pig lead during the week. The leading producer in the United States advanced the price to 6c, an increase of ½c per pound. Even at this figure it was stated that no sales were made, and independent concerns asked and secured as high as 6¼c to 6½c per pound. Locally there was a better demand for lead, and prices held unchanged at 9c to 9½c per pound.

ANTIMONY.—Business in antimony is quiet, and prices were weaker at 16c to 18c per pound.

ALUMINUM.—Market for aluminum was unchanged at 60c per pound. Amount available for domestic consumption is restricted owing to the demands of the Government for war purposes.

PIG IRON.—Interest in pig iron during the week centred around the announcement of the differentials, as arranged by the Steel Committee of the War Industries Board of the United States and the representatives of the steel and iron producers. The differentials are based on the Government's fixed price of $33 per ton for No. 2 foundry and basic iron. The Canadian situation has been affected therby and lower quotations are probable in near future.

COAL GAS AS A SUBSTITUTE

(Continued from page 24.)

process, in the same manner as the ordinary gasoline vapour induction.

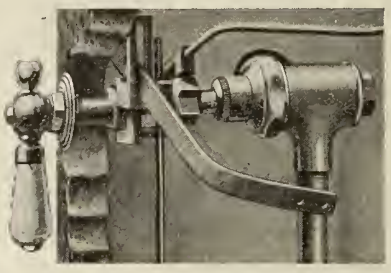
"The principal disadvantage to the use of coal gas for automobiles is the bulky container necessary for the gas. The use of gass for small cars has proved unsatisfactory by reason of the problem of adequate space for storage. A suitable cylinder for containing compressed gas is said to be necessary for the general usage of such fuel for motor cars, and the probability of the continued utilization of coal gas as a substitute for gasoline appears to depend upon facilities for storage or compression."

A PSYCHOLOGICAL COLLECTOR

He was a college boy, home from vacation, and his mother's cook had prevailed upon him to lend her five dollars. Much to the surprise of the family, cook departed from her practice of keeping such funds indefinitely and paid the debt promptly. When questioned about it, she said:

"No, dat boy never once ask me fer dat money. He never dun me at all; but when I serve his late breakfast in de mornin' he always leave five biscuits on de plate, when he used to eat 'em all, an' he tells me he likes five lumps of sugar in his coffee, when everybody knows dat's too sweet. Den when I goes into my kitchen I find five raw potatoes on my table, an' five lumps of coal laid on my stove. Dem fives jest natchully ha'nts me, so I pays him!"

One of the best stories concerning British weather is related by the Bishop of Lydda. "Once, before I was bishop, I was on the top of an omnibus where were seated some Parsees," related his Lordship. "A man said to me, 'What are they?' I replied, 'Indians—Parsees, you know. Men who worship the sun.' And the man replied, 'Oh, I see, and they have come over here for a holiday.'"



TRADE SILENTFILL MARK

Water Closet Combinations Without Ballcocks— No Noise

MANUFACTURED BY

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40-42 Lombard St., Toronto, Can.

Telephone Main 2016

3 BIG REASONS WHY YOU NEED

PURO

(MADE IN CANADA)

1. Puro Sanitary Drinking Fountains will give you a *better* water supply *cheaper.*
2. Puro will cut your water bills 15% to 35%.
3. PURO will safeguard the health of your employes and raise the standard of efficiency.

Are not these reasons enough? Then why hesitate longer?

PURO equipment is not expensive—the first cost is *low* and the up-keep *nothing.* Easily attached; positively fool-proof. Let us make you a special proposition for a try-out in one of your departments. Write us now—to-day—giving us the number of men; an inquiry will cost you nothing.

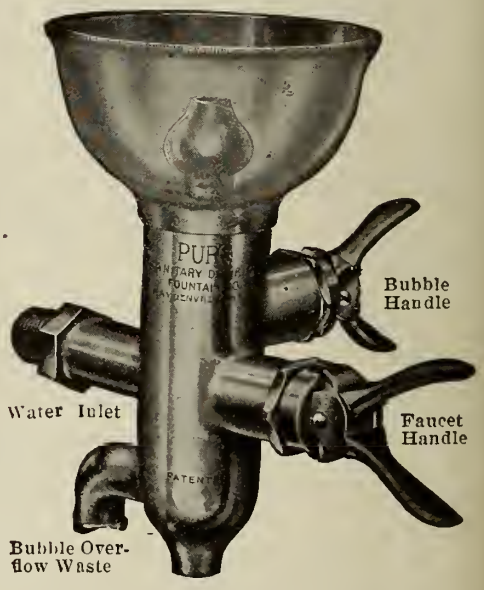
"PURO-FY"

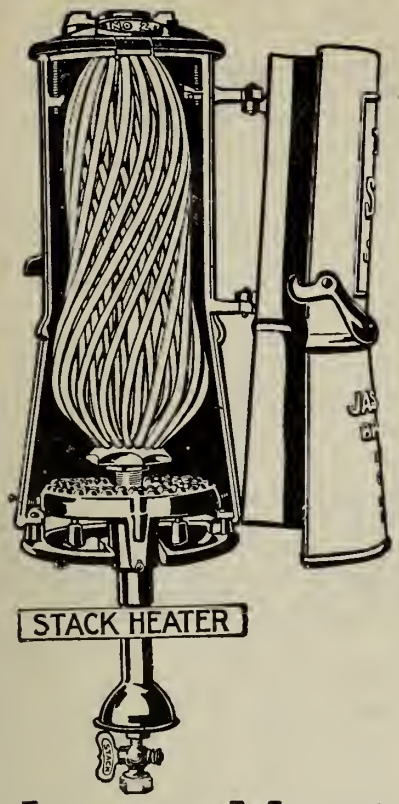
YOUR WATER SUPPLY

Puro Sanitary Drinking Fountain Company

143 University Ave.

TORONTO, CANADA





STACK FACTS

From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited

93-97 Adelaide Street West, TORONTO



HOYT METAL GOODS ARE KNOWN

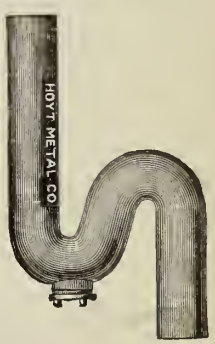
FROM COAST TO COAST



As time-savers there are none equal to our Wiping Solder Bar or Wire Solder.

Hoyt Lead Traps, bends and waste pipe are in a class by themselves.

Our Mixed Metal Sales Amount To Over $5,000,000 Annually.



Write your Jobber

HOYT METAL COMPANY, TORONTO, ONTARIO

New York, N. Y., London, Eng., St. Louis, Mo.

Write Us



Generates its Own Heat!

Only Pipe Solvent that can be used Successfully with COLD WATER

No need to heat water for Desolvo. Simply mix it with cold water and it will produce intense heat and powerful gases that will remove all pipe obstructions thoroughly and quickly. Yet it is harmless.
Oldest and most approved pipe cleaner on the market.
Thaws frozen drains and stacks.

Drop a line on your letterhead and we will send you a trial can absolutely FREE.

The Chamberlain Co., Pittsburg, Pa.

Classified Buyers Guide

Occasionally advertisements are inserted in the paper after this page has gone to press. The insertion of the Advertiser's name on this page is not part of the advertising order, but is inserted solely for the convenience of the reader of the paper

Air Line Systems.
C. A. Dunham Co., Ltd., Toronto.

Air Valves.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.

Asbestos Goods.
James Morrison Brass Mfg. Co., Toronto.

Boilers, Steam or Hot Water.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.
Warden King, Ltd., Montreal.

Boiler Feed Regulators.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Toronto.

Brass Goods, Valves, etc.
Joseph Breeden & Co., Ltd., Birmingham, England.
Canadian Brass Co., Ltd., Galt, Ont.
Canadian Wolverine Co., Ltd., Chatham.
C. A. Dunham Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Limited, Galt.
Jenkins Bros., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Ltd., Walkerville.
H. Mueller Mfg. Co., Ltd, Sarnia, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
Wallaceburg Brass Mfg. Co., Wallaceburg, Ont.
L. Wolff Manufacturing Co., Chicago.

Brass Pipe and Tube.
Canada Metal Co., Ltd., Toronto
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Speakman Supply & Pipe Co., Wilmington, Del.

Cellar Drainers.
Galt Brass Co., Limited, Galt.
James Morrison Brass Mfg. Co., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Chain Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Closets.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Cluff Mfg. Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., Ont.
Galt Brass Mfg. Co., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
L. Wolff Manufacturing Co., Chicago.

Country Residence Equipments.
Darling Bros., Montreal.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto

Damper Regulators.
C. A. Dunham Co., Ltd., Toronto.

Drainage Fittings.
Canada Metal Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Drinking Fountains.
Canada Metal Co., Ltd., Toronto.
Empire Mfg. Co., Ltd., London, Ont.
Puro Sanitary Drinking Fountain Co., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.

Ejectors, Steam.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Kerr Engine Co., Walkerville.

Enamelware.
Amherst Foundry Co., Ltd., Amherst, N.S.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
L. Wolff Manufacturing Co., Chicago.

Electric Pumping Machinery.
Empire Mfg. Co., Ltd., London, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Fittings.
Canada Metal Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Flushometers.
Canadian Brass Co., Ltd., Galt, Ont.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London, Ont.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Standard Sanitary Mfg. Co., Ltd., Toronto.
Speakman Supply & Pipe Co., Wilmington, Del.
L. Wolff Manufacturing Co., Chicago.

Floor and Ceiling Plates.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.
Canada Metal Co., Ltd., Toronto.
Canadian Wolverine Co., Ltd., Chatham.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
James Morrison Brass Mfg. Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Gasoline Engines.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Gas Water Heaters.
Galt Brass Co., Ltd., Galt.
Holstream Heater Co., Cleveland.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Pittsburg Water Heater Co., Toronto.
Rolf Heater Co., Columbus, Ohio.

Generators.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Heaters.
Lord & Burnham Co., Toronto.
Steel & Radiation, Ltd., Toronto.

Lead.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
Hoyt Metal Co., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Mixing Valves.
Canada Metal Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Port Hope Sanitary Mfg. Co., Ltd., Port Hope.
Speakman Supply & Pipe Co., Wilmington, Del.

Monkey Wrenches.
Trimont Mfg. Co., Roxbury, Mass.

Oil Burners
National Rotary Oil Burner Co., Boston, Mass.

Packing.
Canadian Wolverine Co., Ltd., Chatham.

Packless Radiator Valves.
Kerr Engine Works, Walkerville.

Pipe and Radiator Hangers.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,
Beaton & Corbin Mfg. Co., Southington, Conn.

Pipe, Black and Galvanized.
Canadian Tube & Iron Co., Ltd., Montreal.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Steel & Radiation, Ltd., Toronto.

Pipe Cutters.
Trimont Mfg. Co., Roxbury, Mass.

Pipe Joint Compounds.
Canadian Wolverine Co., Ltd., Chatham.
James Morrison Brass Mfg. Co., Ltd., Toronto.

Pipe, Soil, and Fittings.
Anthes Foundry Co., Toronto and Winnipeg.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Toronto Hardware Mfg. Co., Toronto.

Pipe Threading Tools and Machinery.
Borden Canadian Co., Toronto.
John Hall & Sons, Ltd., Brantford.
A. B. Jardine & Co., Hespeler.

Pipe Wrenches.
Borden Canadian Co., Toronto.
Trimont Mfg. Co., Roxbury, Mass.

Porcelain Ware.
Canada Metal Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
L. Wolff Manufacturing Co., Chicago.

Pumps.
C. A. Dunham Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

Radiators.
Lord & Burnham Co., Ltd., Toronto.
Steel & Radiation, Ltd., Toronto.

Radiator Foot Rests.
Beaton & Cadwell Mfg. Co., New Britain, Conn.,

Radiator Traps (Steam).
C. A. Dunham Co., Ltd., Toronto.
Peacock Brothers, Montreal.

Range Boilers
Toronto Hardware Mfg. Co., Toronto.

Reducing Pressure Valves.
Darling Bros., Montreal.
C. A. Dunham Co., Ltd., Toronto.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Roof Flanges and Flashings.
Canada Metal Co., Toronto.
Simplex Sales Co., Chicago.

Rubber Goods
Canadian Consolidated Rubber Co., Ltd., Montreal.

Septic Tank Valves and Syphons.
Anthes Foundry Co., Ltd., Toronto.
Galt Brass Co., Ltd., Galt.
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H. Mueller Mfg. Co., Ltd., Sarnia, Ont.

Solder.
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Hoyt Metal Co., Toronto.

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C. A. Dunham Co., Ltd., Toronto.
Kerr Engine Co., Walkerville, Ont.
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Canadian Morehead Co., Ltd., Woodstock.
Darling Bros., Montreal.
C. A. Dunham Co., Ltd., Toronto.

Smoke Test Machines.
James Morrison Brass Mfg. Co., Ltd., Toronto.

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Canadian Machinery Co., Ltd., West Toronto.
Ontario Wind Engine & Pump Co., Ltd., Toronto.

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James Morrison Brass Mfg. Co., Ltd., Toronto.

Tools.
Canadian Wolverine Co., Ltd., Chatham.
Empire Mfg. Co., Ltd., London.
James Morrison Brass Mfg. Co., Ltd., Toronto.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Trimont Mfg. Co., Roxbury, Mass.
Williams, J. H., & Co., Brooklyn, N.Y.

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Dart Union Co., Ltd., Toronto.

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C. A. Dunham Co., Ltd., Toronto.
Moline Heat, Moline, Ill.

Vent Caps
Malcolm Co., Toronto.

Vitro Tanks.
Cluff Mfg. Co., Ltd., Toronto.

Vacuum Systems of Heating.
C. A. Dunham Co., Ltd., Toronto.

Water Supply Systems.
Empire Mfg. Co., Ltd., London, Ont.
H. Mueller Mfg. Co., Ltd., Sarnia, Ont.
Ontario Wind Engine & Pump Co., Ltd., Toronto



QUALITY PLUMBING

WHENEVER Wolff Plumbing is installed, there is the certain reward of a satisfied customer. In every detail of material, workmanship and style, Wolff Plumbing measures up to the expectations of owner, architect and contractor. Everything needed for complete installations is manufactured and fitted perfectly in our own factories, and carries the Wolff guarantee—the mark of Plumbing Quality for 60 years.

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L. WOLFF MANUFACTURING CO. TRADE MARK CHICAGO

Toronto Hardware Manufacturing Co.

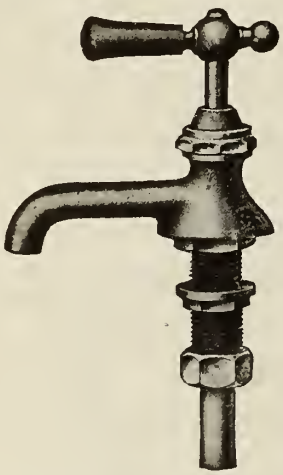
Recommend the Purchase of

Victory War Bonds

Joseph Breeden & Co., Ltd.

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Fazeley Street, Birmingham, England



MANUFACTURERS OF

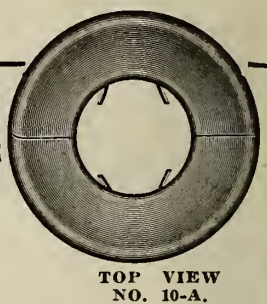
HIGH CLASS

Steam and Water Fittings



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

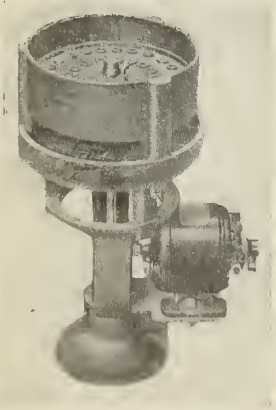
Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.



NEW DIFFERENT BETTER

The cost of coal is a serious problem to-day. Your customers have all tried to solve it and failed. We have tried and succeeded.

ROTARY OIL BURNER

is the result of our labors. It burns fuel. oil, or kerosene. Can be installed by any plumber. Works in connection with present heater. Installed in the fire-box, gives a terrific fire in a few seconds. Can be turned off instantly when not needed. No trouble to take care of. Big profits for the plumber and an unlimited field.

NATIONAL ROTARY OIL BURNER COMPANY

235 Congress Street, BOSTON, MASS.

PROGRESSIVE REPRESENTATIVES WANTED EVERYWHERE.



A SYPHON WITHOUT A SINGLE FAULT

YOU CANNOT AFFORD TO TAKE CHANCES

You cannot afford to take chances with a syphon. It is the heart of a sanitary septic tank. Intermittent discharge is absolutely necessary, or the whole sewage system will be a failure. We unconditionally guarantee every syphon.

We manufacture a full line of cast iron pipe fittings at both our plants.

Ask your jobber for "Anthes" Syphons and accept no other.

ANTHES FOUNDRY, LIMITED

TORONTO and WINNIPEG

THE TINSMITH'S HELPER AND PATTERN BOOK

By H. K. Vosburgh Revised by William Neubecker

This is a book of 135 pages, 54 plates. Epitome of mensuration. Mensuration of surfaces. Tables, Rules and Recipes. Practical Receipts, on the making of all kinds of solder.

The Most Practical "Helper" Ever Introduced Into The Tinshop.

PRICE $1.00, Postage Prepaid.

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MACLEAN PUBLISHING COMPANY, LIMITED

143-153 University Avenue, Toronto



Have You Bought a VICTORY BOND?

IF SO THE NEXT BEST THING IS TO GET OUR PRICES ON

SHEET LEAD—SOLDER—LEAD PIPE and everything in Plumbing Supplies.

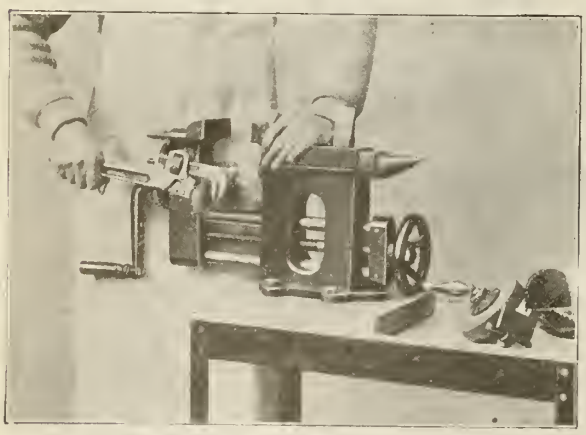
THE CANADA METAL COMPANY, LIMITED

Montreal Hamilton TORONTO Winnipeg Vancouver

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THE
Stewart Handy Worker
An Equipment All in One



WEIGHS 90 POUNDS

The Equipment Comprises—

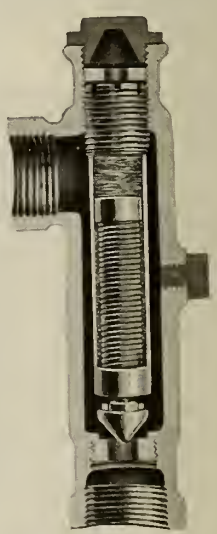
A Pipe Vise
A Bench Vise
A Bench Grinder
A Two-Speed Drill
A Hardy Cutter
An Anvil

It's not a toy. It's a real combination of practical tools for practical people.

Write for full particulars.

CHICAGO FLEXIBLE SHAFT COMPANY
Department H.W. CHICAGO, U. S. A.

Trap Every Steam Line
With a "SARCO"—
Radiators Too



The Steam Trap "SARCO" is not like other steam traps, it relies on the expansion of a heavy hydrocarbon oil operating a Sarco spirally corrugated Tube within a renewable cartridge. When steam reaches the cartridge, the trap closes and no steam escapes. When condensation collects the trap opens and discharges it.

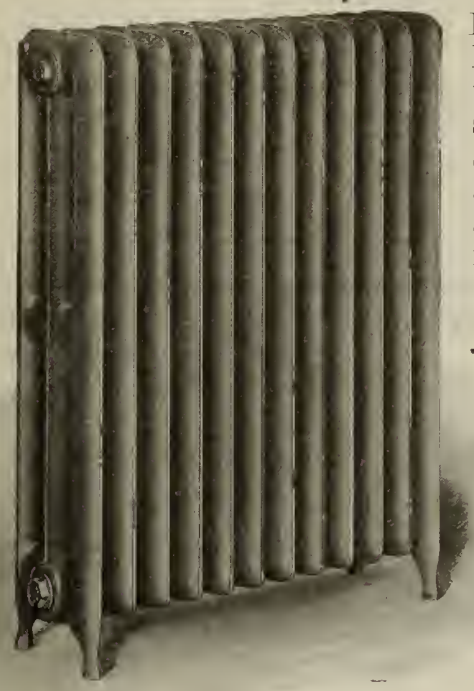
The "Sarco" can be used on either steam lines or radiators, for low pressure, vapor or vacuum heating system; is easily installed, automatic in operation.

The "Sarco" is absolutely noiseless, self-cleaning and no moving parts. All parts of the interior are interchangeable and removable. The "Sarco" can be attached to radiators at any angle, and in any position.

Prices low. Write us at once. Can make prompt deliveries.

Peacock Brothers, Montreal
and 220 King Street W., Toronto
BRUCE G. McBURNEY, E.E., *Representative*
Winnipeg, Edmonton, Calgary, Vancouver and Victoria, B.C.

Imperial Radiation Gives 100 Per Cent. Efficient Distribution



Getting the heat distributed

Imperial Radiation represents the most advanced ideas in heat distribution.

It allows free circulation and the rapid movement of heat from the boiler to the point of distribution—the radiator. Imperial Radiators, being smooth inside and offering no obstruction, are always well supplied with **hot** water. Heat-waste between boiler and radiator is reduced to a minimum—practically all heat being delivered to and given off through the radiator, where it is, of course, most effective.

WRITE US FOR PRICES.

STEEL and RADIATION, Limited

Head Office: FRASER AVENUE, TORONTO

304 University Street, MONTREAL 101 St. John Street, QUEBEC

AGENCIES IN ALL LEADING CITIES

The Cost of Selling

SCARCELY necessary, is it? to protest that you must spend some money, much or little, to keep yourself and your merchandise known to your customers and should-be customers.

This you admit, but—DO YOU FOLLOW CLOSE UP THE LEAD OF YOUR CONVICTION?

Are you spending the money?

Let's look at the cost of close-up work in

The FARMER'S MAGAZINE

A half-page 12 times will cost you $367.20 ($30.60 per insertion). A full page. $714.00 ($59.60 per insertion).

Not a heavy annual cost to canvass the choicest class of farmers in this country—farm homes of greatest prosperity, progressiveness and capacity.

But—are you keeping a salesman always on the job?

You should—and can, at so low a price.

Write in about it.

World-Famed Specimens of the Age of Steel

TRIMO



WITH FLAT-LINK OR CABLE CHAIN

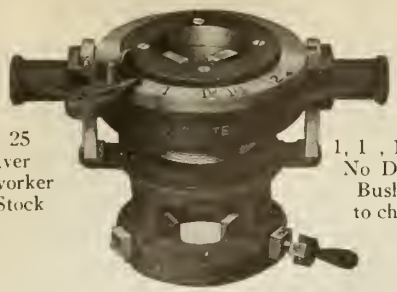
TOOLS

Send for Catalog No. 91

MADE BY

TRIMONT MFG. CO., 55 Amory St., Roxbury, Mass., U.S.A.

Please Mention Sanitary Engineer When Writing Advertisers



No. 25 Beaver easy-worker Die Stock

1, 1¼, 1½, & 2 No Dies or Bushings to change

You Don't Pay for "Beavers"—

THEY PAY FOR THEMSELVES

Figure it out for yourself! Thousands of Beavers have been in constant use for nearly 10 years—and are still good.

The cost works out at about ½ cent a day for the tool shown in this advertisement.

Call up your jobber now—and order a "Beaver" or at least write for booklet D-12.

MANUFACTURED BY

THE BORDEN-CANADIAN COMPANY

TORONTO, CANADA

WROUGHT PIPE

BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.

All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES

Black and Galvanized All Sizes

Ask your jobber for CT Brand

CANADIAN TUBE & IRON CO., LIMITED

Montreal Works: Lachine, Can.

"B & C"

COMBINATION

Floor and Ceiling

PLATES



No. 10 Steel 3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

Send for catalog of complete line.

MANUFACTURED EXCLUSIVELY BY THE

Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:

W. H. CUNNINGHAM, 98 Kingswood Rd., Toronto, Canada.



Advertising makes for a better product—

Not only does advertising create a good impression regarding the product advertised but it **makes for a better product.** There are added responsibility and written-printed claims to substantiate.

This is the sure coupling

DART



A Dart Union will make the coupling sure and certain and give you a job over which you need have no misgivings. "Bronze to Bronze" seats mean no rust, no deterioration—a right job and a tight job every time. Extra heavy iron parts mean no stretching or pulling apart, and the ball-shaped joint means a perfect connection even when pipes are out of alignment.

For your own sake and your customers use a Dart Union every time.

Saves time—makes sure.
Your jobber sells them.

Made in Canada by
DART UNION COMPANY, LIMITED
TORONTO, CANADA

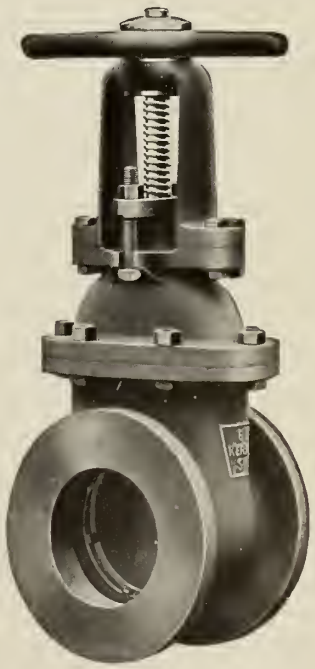
BRONZE
TO
BRONZE
DOES IT.

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

Approved by the Fire Underwriters Association, and Registered by Boiler Inspection Departments of Ontario, Saskatchewan and Alberta.

THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Plain Duty and Good Business

urge you to buy Canada's Victory Bonds *now*. Your money is needed to buy *in Canada* the munitions and equipment so necessary to the successful conduct of this great battle for democracy and sane ideals. Even though you have never before invested your money it is your patriotic duty now to offer your savings to the Government.

Buy Victory Bonds

They are always as good as cash—are absolutely safe and earn 5½ per cent. interest.

The safest, most patriotic and most profitable investment for everyone.

This Space Donated by

Galt Brass Co., Limited

Galt, Ontario

SANITARY ENGINEER
PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, DECEMBER 1, 1917 | No. 23



OLYMPIC—Plate A15D

Quietness is a real closet Virtue

We lay stress on the fact that Empire Water Closets operate quietly because quietness of operation is one of the strongest selling points a closet can have. The householder whom you are trying to interest in an Empire Closet has experienced, either in his own home or in that of a friend, the embarrassment caused by a noisy roaring closet with a "whistling" tank.

So when you point out to him that Empire Closets operate smoothly and quietly, he readily realizes the advantage of this feature. Then, when you show him an Empire Closet Combination set up, or even a good illustration, the perfect, neat, graceful design just about closes that sale.

Empire Closet Combinations are supplied with any style or finish closet seat, Oak, Birch, Mahogany, or the genuine sheet pyrolin white seats, with no exposed metal.

We also carry in stock all lines of Oak or Vitro Tanks as well as Water and Oil Controlled Flush Valves.

Empire Manufacturing Co.
Limited

London **Toronto**

"Everlasting" Glass Floats

are effective, durable, powerful. Will close off any pressure up to 200 pounds.

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

AGENCIES:

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Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Test Our Service

Your smallest need in Rubber receives careful attention when entrusted to us. Our equipment and facilities for manufacturing "Everything in Rubber" offer a decided advantage in filling your orders promptly. The care given to each detail makes it possible to render a service that cannot be duplicated within your reach.

Put us to the test. Write to our nearest branch and see for yourself what the Dominion Rubber System service means to you.

Canadian Consolidated Rubber Co. Limited

Head Office · · MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Kitchener, London, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

The Largest Manufacturers of Rubber in the British Empire.

WE SPECIALIZE

In the Manufacture of

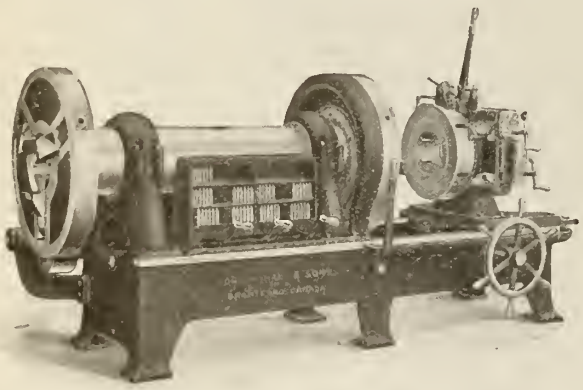
CAST IRON SOIL PIPE and FITTINGS

as well as

GALVANIZED RANGE BOILERS AND EXPANSION TANKS
FOR HEATING SYSTEMS

TORONTO HARDWARE MFG. CO., LIMITED

Pipe Machines of Merit



THE HALL No. 8

Duplex Improved Gear Box Driven. Capacity 2½ in. to 8 in. inclusive.

Note the drive belt at rear out of operator's way. Elevated die cabinet, control lever and speed levers all convenient to operator's right hand. Sliding die head.

These machines are equipped with a friction clutch, enabling operator to revolve pipe a few inches, if necessary.

Pipe Machines ranging from ⅛ to 18".
Nipple Machines ranging from ⅛ to 4".
Roller Pipe Cutters ranging from ⅛ to 4".

Delivery from stock.

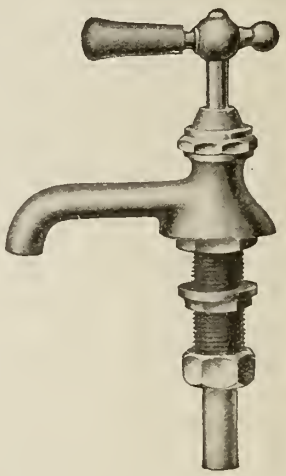
Write us for full particulars and prices.

John H. Hall & Sons, Ltd., Brantford, Can.

Joseph Breeden & Co., Ltd.

NEW MILL WORKS

Fazeley Street, Birmingham, England



MANUFACTURERS OF

HIGH CLASS

Steam and Water Fittings



Generates its Own Heat!

Only Pipe Solvent that can be used Successfully with COLD WATER

No need to heat water for Desolvo. Simply mix it with cold water and it will produce intense heat and powerful gases that will remove all pipe obstructions thoroughly and quickly. Yet it is harmless.
Oldest and most approved pipe cleaner on the market.
Thaws frozen drains and stacks.

Drop a line on your letterhead and we will send you a trial can absolutely FREE.

The Chamberlain Co., Pittsburg, Pa.

Don't Take Any Chances

blowing up by using the ordinary explosive can in thawing frozen pipes. "SAFETY FIRST."

Use Wolverine Thawing Steamer

Made from Heavy Copper and equipped with

SAFETY VALVE

thereby eliminating the possible dangers of fire, explosion, and perhaps loss of life.



This is No. 5305

Use Wolverine Thawing Steamer

Tank fits the large or small shields on any coil furnace.

Thawing Hose, Connections and Furnaces listed in Catalog "C."

Canadian Wolverine Company, Ltd.

CHATHAM, ONTARIO

PIPE THREADING TOOLS

It is Evidence Like This



"Toledo" Geared Adjustable Threading Tool No. 2 making a cut and thread on a 4-inch bend in position. It was desired to install a steam separator above throttle of engine, and the whole job was satisfactorily completed without removing the pipe line.

which proves the extra value of "Jardine" and "Toledo" Pipe Threading Tools

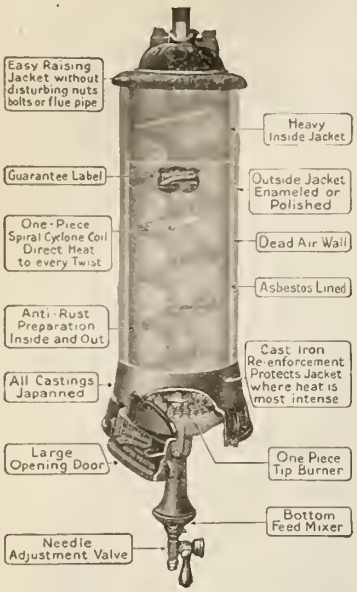
"Jardine" and "Toledo" Pipe-Threading Tools cut clean, sharp threads with a minimum of muscular effort. They permit of one man doing work which ordinarily requires two. But even more important than this, they will work in any odd corner. Instance the job illustrated in the accompanying engraving. Here is a case where, with an ordinary tool, the whole pipe line would have had to be taken down. The tool paid for itself on that one job.

Investigate "Jardine" and "Toledo" Tools yourself. Ask us to send names of users in your locality. Then go and talk to these men in your own business and learn what they think of these good tools.

A. B. JARDINE & CO., Limited, Hespeler, Ont.

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.

Service-Speed-Economy



The Hotstream HEATS IN A HURRY WATER HEATER

BEST FOR BAD WATER

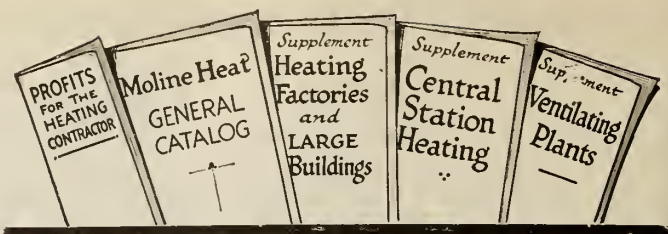
Quality Survives

Also Made With Cast Iron jacket.

The Hotstream Heater Co.

CLEVELAND, OHIO

W. H. CUNNINGHAM, 98 Kingswood Rd,. TORONTO
Canadian Representative



These Valuable Books *Free!*

Each one is worth big money to you. Every heating contractor should have them. They cover all the latest money-making ideas in figuring and installing steam heat—hot water heat—vapor heat—and vacuum systems.

These books will help you to land more orders and increase your profit on every job. Write for them at once. They are absolutely ***FREE!***



Moline Illinois

"B & C"

COMBINATION

Floor and Ceiling PLATES



No. 10 Steel
3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

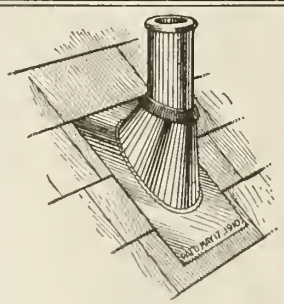
Send for catalog of complete line.

MANUFACTURED EXCLUSIVELY BY THE

Beaton & Corbin Mfg. Co., The Old Original Company Southington, Conn.

Canadian Representative:
W. H. CUNNINGHAM, 98 Kingswood Rd., Toronto, Canada.

The "Simplex" Roof Flashing



The shape of the sleeve makes it possible to fit any pitch roof from 50° to flat. Made of very best galvanized iron or copper with pure lead collar. This is the simplest and best adjustable roof flange on the market.

Ask your jobber to supply "Simplex" on your next order.

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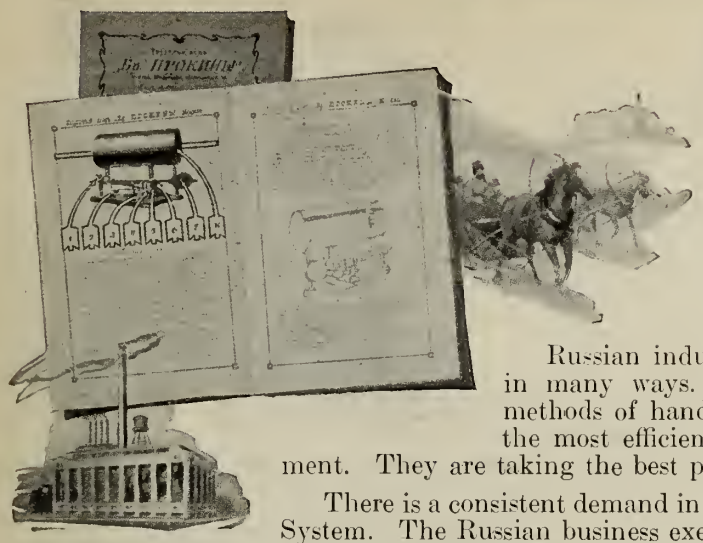
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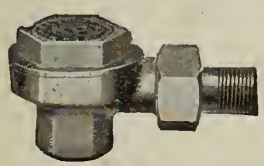
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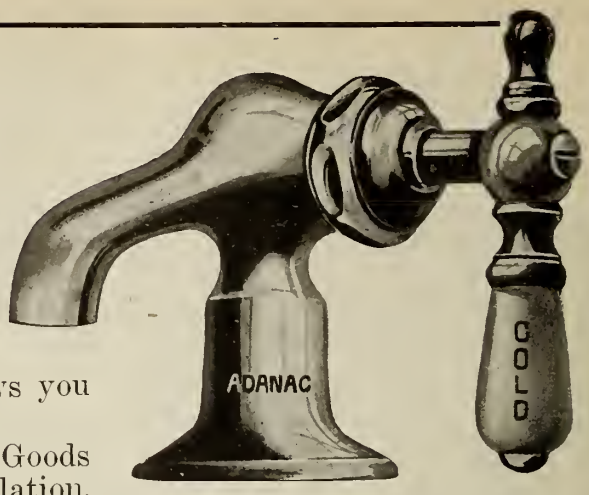
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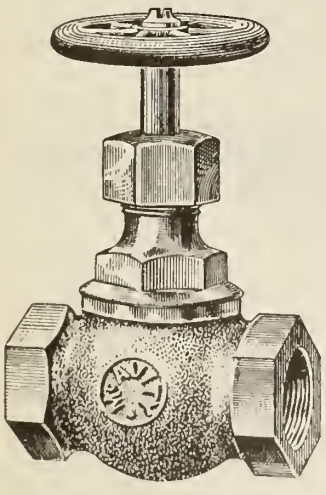
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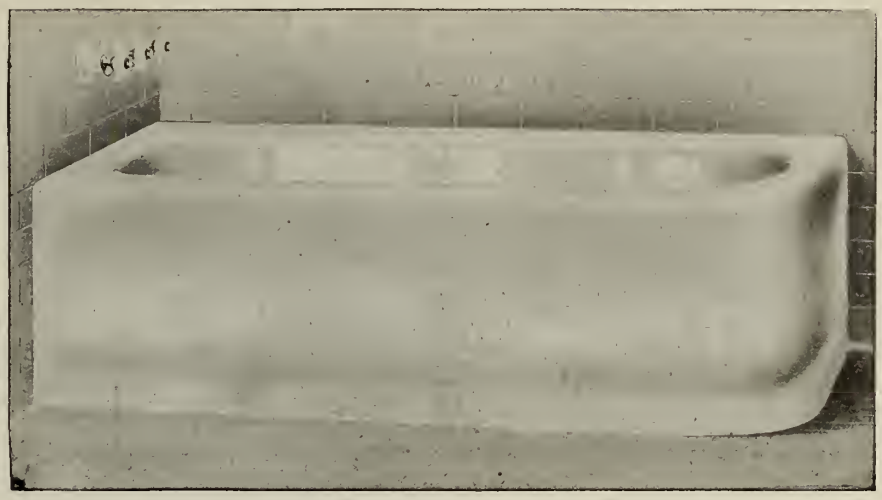


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SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, DECEMBER 1, 1917 No. 23

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EDITORIAL

Our Duty to the Rising Generation of Mechanics.

The MacLean Publishing Co., Limited

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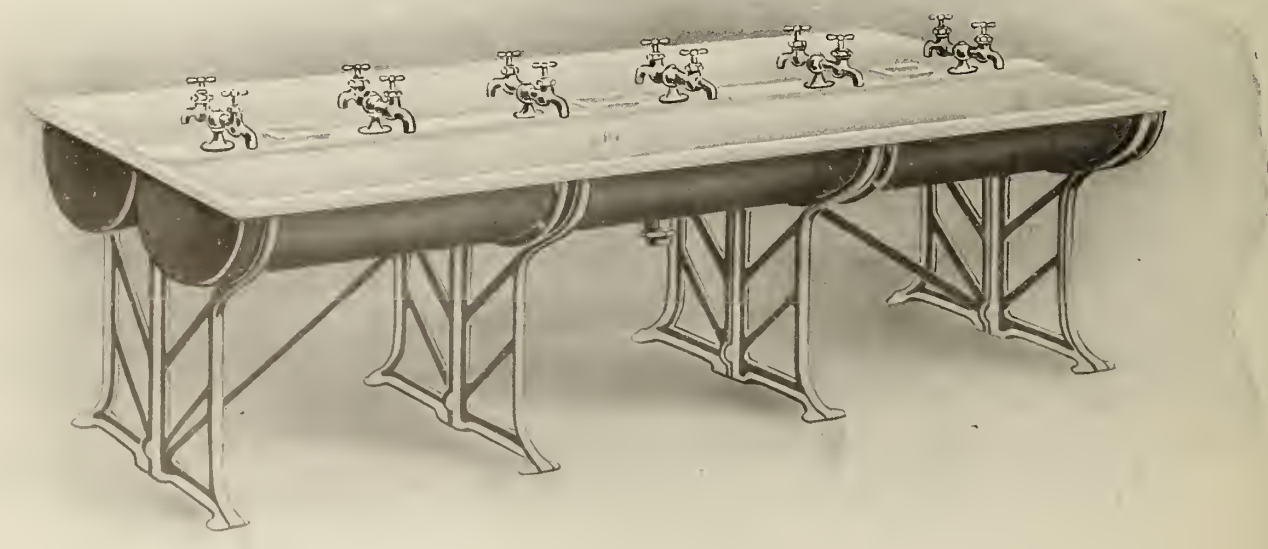
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SANITARY ENGINEER

VOL. XI DECEMBER 1, 1917 No. 23

Create a Special Buying Account

Incidentally Mentioning the Victory Bond Loan—The Campaign That Has Just Closed is Worth Millions as an Object Lesson to Every Canadian — Every Business-man Should Take This Campaign as Example of How to Finance His Own Business—This Loan is a National Business Loan.

By Thomas Stansfield.

"IT is all very well, Mr. Editor, for you to publish articles advising your readers to create a special account," said one of our readers the other day. "But I fail to see how a person can take money out of his business, if he has just debts to pay."

The above is only one of the remarks made about the articles that have appeared in SANITARY ENGINEER recently. We would call our readers' attention particularly to the one which appeared in the Oct. 15 issue entitled "Now Time To Study Business Insurance," and another entitled "Create a Special Buying Account."

There is one big grim fact, however, which we cannot side-track and that is the financial standing of the trade as a whole. We have often referred to this fact, that the ratings in Dun's & Bradstreet's are not very glowing, and the impression which the general public has of members of the trade too is not enviable.

Many men in the trade will be likely to say that they do not care a jot what the public think. That is not the right spirit to show towards the public. They are our patrons. We depend upon their business, and more than in any other trade, they are at the mercy of our men and the service we perform. It would therefore seem to be the best thing for us to do to cater more to them, not in any servile way, but rather by way of taking more personal interest in each and every one of them and their problems.

Our readers may think that the above arguments have no bearing upon the subject under discussion, but we will endeavor to show the relationship between our finance and our customers and the service we render them.

In the first place, sanitary and heating engineers, as a rule, are poor collectors. They do not often render accounts as promptly as they should, and this, above all other matters, is liable to create in the minds of one's customers the idea that our methods are lax. These same customers very often are of the opinion that they are charged such a high price that the sanitary and heating engineer can afford to wait for his money; and this waiting for accounts due has a very important bearing upon the financial standing of any business.

If collections are slow, there is also a poor chance of laying aside any monthly instalment of money as advised in Mr. Johnson's article on business insurance. So it would appear to be very important that customers be catered to pleasantly, that they have their accounts rendered promptly and if not paid within say a week or so, a personal call be made. Then, providing there is any dispute to be settled or any complaint made, it can be straightened out at once in as courteous a manner as possible.

The writer called upon quite a large number of big business men recently with a view of finding out how they viewed the plumber and his bill, etc., and out of nine so called upon there was only one that appeared to be highly satisfied with his plumber. The strange thing was that his plumber did work for 3 of the other 9. Even this man said he never worried about the plumber's bill until it was a few months old; he never gave the matter a thought, except that when the bill was sent in, it was generally a month old then, and he invariably put it into the "long-winded" bill file. So that prompt rendering of accounts would no doubt be liable to create a good impression in the minds of our patrons and collections or settlements would be so much quicker. Now as to the object lesson which the recent campaign in connection with the Victory Bonds has for sanitary engineers.

Here, the whole of Canada is put up as security for money loaned by the people for the people. The more individual subscribers the better.

The Victory Bond is a document which shows that every subscriber to it has a real holding in the nation. He has something to show for his savings, which are the concrete results of his labors.

But what a difference in the case of a business man in the sanitary and heating profession. How many are there in Canada and in fact the world over who have worked hard for years, paid hundred of thousands of dollars out for labor and material and then wound up in the bankruptcy court or its equivalent!

Nothing to show for their years of hard toil! Why? Because they did not set aside a sinking fund, because they did not provide any business insurance fund. They have done nothing but assist to keep the jobbers, the manufacturer and their salesmen and other employees in work.

The writer knows one particular individual who after 10 years' real hard work in a business had to close up shop and owed his creditors approximately $5,000. He had paid for supplies about $114,000, $50,000 for wages and about $36,000 overhead. His 10 years' turnover was $200,000; and he failed, owing $5,000 at the last. Does that not show that something was wrong?

It was not exactly what one would term careless management. It was just a case of not having the true grip upon his business, he was not properly in touch with the details of his business and had no business insurance fund.

This man worked and transacted business for capital and labor amounting to $20,000 a year for nothing.

Now suppose he had added 2½% to his overhead, he could have paid his debts at least. But if he had added 5% he would have been $5,000 in pocket.

After a year or two's business experience it might have occurred to him to ask himself why he should conduct a business on behalf of other people, for that is what he was doing. He paid out money and assumed responsibility for a business with an annual turnover of $20,000 with no profit to himself.

It may be urged that in any case he lived out of the business. This is only partly true. He got his board, but no wages, and there are thousands of farmers who would be glad to take a man on for his board and his clothes. But the farmer has to pay board and wages, the latter representing profit.

Business insurance, or a special buying account, is one of the foremost essentials in every man's business for several reasons. Just as in the case we referred to in last issue, where a wife put away her savings and was able to buy for cash less 5 per cent. and turn $1,000 over eight times, thus making $400 profit on that one fund, a matter of 40 per cent. per annum, so the man who provides a special buying account can do the same.

Another thing the business man with a special buying account can do is to watch the trend of the market and take advantage of opportunities of purchasing below market rates.

One reader of SANITARY ENGINEER a few days ago got an offer of several tons of pig lead at 2 cents less than market price for cash. Just imagine, nearly 25 per cent. saved on one transaction.

It is no doubt a fact that money talks, and the man who conducts a business without creating a special buying account is really allowing money to talk for the other fellow instead of for himself.

LETTERS TO THE EDITOR

The Main House Trap Again

FOR some time past I have been reading with interest the different articles appearing from time to time in the SANITARY ENGINEER with regard to the main house trap. In Fort William we have 35 miles of sewers and close on to five thousand connections to same. The main house trap is not in use, and sewers are ventilated direct through stacks in premises and the city has very little trouble with drains freezing in the winter time. The freeze-ups take place on the house drain on streets where sewers have little cover owing to the streets not being filled up to grade, and we find the frozen spot generally in the water table where the house drain has little or no cover. This is caused by the waste from the house rather than air from the sewer; wherever we have sufficient cover there is no trouble, and we have a temperature ranging round 20 deg. to 40 deg. below zero for considerable periods of time.

Personally I consider the main house trap and breather a nuisance, and any claims for it serving any useful purpose have been long since exploded for reasons that have been stated time and again. not only in SANITARY ENGINEER, but also in other scientific papers the world over. These statements we can accept as positive emanating from such sources as the British Commission appointed several years ago to enquire into and report on the matter.

However, I can well understand the situation that would develop in a city where the installation of the main house trap was an institution if it were suddenly decided to eliminate the traps in all new connections. The result would be that where a sewer was not thoroughly ventilated a pressure of sewer air would be generated and that pressure would take the line of least resistance, naturally rushing to the drain and stack without a trap. If near a manhole cover and the temperature 40 deg. below, then the inevitable happens. Therefore, to counteract such a contingency, they keep on installing the main house trap, and ventilate their sewers by other methods. Where there are no main traps, the air pressure on the sewer is negligible and there is no air rush to any particular line carrying moisture and frost at the same time. The system without the trap, as carried out here, has saved Fort William thousands of dollars and will save it many thousands more, which goes to prove the advantages obtained by the elimination of the trap.

Another matter which is interesting me considerably is the question of cast iron v. wrought iron for a plumbing installation. I cannot imagine any person of scientific attainments with even a rudimentary knowledge of metals questioning the superior durability of cast iron as compared with wrought iron. The component parts of cast iron are very close to the natural ore, and when it comes to wearing qualities it is hard to beat mother nature. Wrought iron, although practically the same material, undergoes in its manufacture certain processes which toughen it and make it more ductile. The change however is made at the expense of its wearing qualities when used under certain conditions, of which a plumbing job is one. Galvanizing the wrought iron will materially add to its life for such work. Galvanizers, however, know that the process does not make a positive anti-rust preventive, but that deterioration will eventually occur, particularly if it comes within the influence of certain acids or within range of ocean air.

A large building here in which plumbing was installed about twelve years ago was recently stripped. The cast iron soil pipe was practically as good as new (no main house trap), and the system was vented in the usual manner. The cast iron, as stated, was in first class condition although where situated in basements and floors it was rusted on the surface, but not eaten into to any perceptible extent. Inside, the piping had a thin coating of slime which appeared to entirely preserve it from rust. In the pipes above fixtures, which were subject to vapor from both fixtures and sewer and also to a downward suction of fresh air when a battery of fixtures would be flushed, there was no perceptible deterioration. All waste lines were cast iron. This job was installed before the city by-law insisted on galvanized pipe for vent work; and black pipe was used instead. Even the black pipe after this period of time was in fair condition, although showing signs of scaling, and if galvanized pipe had been used on the air lines, I believe the job would have been as good as on day installed. This shows that ventilation is not only necessary to prevent syphonage, etc.; but also prevents noxious gases eating into the various metals in an installation by carrying same to the outer air, instead of lodging in pockets throughout the system. As I heard one prominent sanitary engineer express himself,—"Plenty of fresh air is as necessary to a plumbing system as to a human being if we expect either to have a reasonably long and useful life."

EDITOR'S NOTE

It is doubtful if there ever was as much interest shown in the problem of the main house trap as is the case at the present day. SANITARY ENGINEER does not endorse the main house trap. It does however respect the views of both sides, and opens its pages for a full and free discussion of the problem, because problem it no doubt is. One thing we feel sure every reader will agree upon, and that is, that those cities which have never begun to use the main house trap are very fortunate, while the cities that found the trap in use years ago are no doubt compelled by circumstances to perpetuate an insanitary contrivance.

The man stammered painfully as he stood in the dock at the police court. His name was Sissons, and it was very difficult to pronounce.

He had had the misfortune to stay out late and make an uproar the previous night, so that he had to account for it before the magistrate next morning.

"What is your name?" asked the magistrate.

Sissons began to reply.

"Sss-s--s---s---"——

"Stop that noise and tell me your name," said the magistrate testily.

"Sss-sss-sss-ss"——

"That will do," growled the magistrate severely. "Constable, what is this man charged with?"

"Yer worship, I think he's charged with sodywather," replied the policeman earnestly.

Lack of Comfort Stations in Cities

Present Ones a Disgrace to the City of Toronto—Medical Health Officer Would Not Allow Civilians to Permit Such Disgraceful Conditions—Talk of Spending $35,000 on New Lavatories—Sum Not Nearly Sufficient—City of Regina Also Wants More Public Comfort Stations.

WE doubt very much if there is a city on this continent that is in a worse condition for lack of public comfort station accommodation than is Toronto. If it were not for the hotels which, in spite of the fact that the prohibition bill put a large number out of business, still give a splendid service to the public free, the citizens and transient visitors of Toronto would be very badly accommodated.

It is all very well to cry, "Save, Save," "Conserve," "Thrift," and all that, but how many of those who appear to believe in thrift and saving really know what they are doing? Is it saving to allow humanity to suffer and set up all manner of possible diseases that could be prevented if a goodly number of public comfort stations were erected throughout our cities? Is it economy to assist all manner of diseases to become rampant, and in that way run down the vitality of the Canadian people, and all for money's sake?

It is a big question, and we want big men to cope with it. What is the use of creating diseases about as fast as we know how on the one hand and on the other paying to have medical men trained to cure these diseases.

We want thinking men in our council chambers. We want men who, first of all, understand the requirements of the human body. Toronto is a city that can respond nobly when men and money are wanted to alleviate pain and suffering or bring this terrible war to a close, yet we venture to say that very few of our men of affairs know human nature as they should. Very few have given much thought to the law of prevention, and prevention is better than cure. We have scores of medical men in Toronto and almost every other city who have been clamoring for more public comfort stations, but all to no avail. Why? Because the false economy bug has got into the minds of our men of affairs.

The Toronto Exhibition public comfort stations are a disgrace and would not be allowed if provided by any hotel or other place of business. Yet our city fathers are allowed by the Board of Health to endanger the public health when they conduct or permit such unsanitary places to exist.

Just imagine the abomination such places are to those who make use of them. Just imagine anyone who knows even very little about sanitary appliances and the service they should give to the public going a second time into one of those so-called public comfort stations.

Then let us recall the way the Toronto City Council, the Board of Control and health department has shelved all attempts at real improvement.

But we learn that another attempt is being made to improve the conditions at the Exhibition Grounds.

> "At a meeting recently held of the Board of Directors of the Canadian National Exhibition it was decided to complete the proposed new lavatories in time for the opening of the fair in 1918 at a cost of $35,000. A year ago, after giving the city a cheque for $34,000 from the 1916 revenue, $25,000 was retained with the consent of the City Council to provide new lavatory accommodation."

To the average citizen the sum of $35,000 may appear a lot of money to spend on public comfort stations, but to the practical man who knows just about what can be procured in that line, the sum is miserably small, quite inadequate for such a purpose, if the insanitary places are to be really improved or rebuilt.

We do not know just how this $35,000 is to be spent, nor can we learn what kind of places are to be built with the money, but we do think that more like $100,000 would be necessary if permanent improvements are to be made.

For example as matters are to-day in the exhibition, every building nearly contains some kind of an apology for public comfort stations. Billboards are placed all over the grounds directing people to these places, and at best there is great difficulty in locating same without asking some one to direct one to them.

Now what would be far better in the opinion of SANITARY ENGINEER would be to build one large central public comfort station, in some conspicuous place. Let it be more than a public comfort station as such places are at present built.

The building should be a monument to sanitation, a work of art and of real sanitation. Let there be rest rooms for ladies as well as gentlemen, reading rooms, places where a letter could be written and mailed, a post office, barber's shop, shoe shining parlors and regular toilet room, where either ladies or gentlemen could have a real good wash and brush up, and above all let the place be kept really clean and sanitary.

There is no reason in the world why such a building could not be erected, and all those insanitary places that are a disgrace to the name "public comfort stations" be closed up. The room would be valuable for other purposes, and there would be no need of signs all over the place directing people where to go, as is necessary under present arrangements.

The writer met several Toronto gentlemen recently and the subject of comfort stations came "on the carpet." These men all agreed that the public comfort station problem was poorly handled in our Canadian cities and one of them went so far as to say that it was just as necessary as a Red Cross contribution campaign. He said if Toronto were to start a public comfort station campaign he would be willing to contribute a nice sized cheque towards the fund. If people were appealed to in a proper manner, and properly informed as to the real necessity of such places, we firmly believe the scheme would be a success.

We have learned that merchants in the United States are being furnished with cards that are placed in one corner of their windows, these cards have a registered sign which consists of an orange colored circle, and in the centre there is a four-pointed star in green, then at the top of the card appears the words "Within Ladies' Comfort Station."

This sign as stated before has been registered in the United States and is being recognized now by quite a number of health boards in a number of the states in the union. Why could we not adopt some such sign on all our Canadian public comfort stations instead of the printed words?

Such a sign would be easy to observe, could be recognized at a glance and the meaning at once conveyed to one's mind as to what the place was. No one when seeing a red cross can be misled as to its meaning, and the same argument holds good with an emblem such as that suggested. It is a shame to note how very little thought our city fathers give to problems of sanitation these days, in spite of the fact that every one is well aware that cleanliness is next to godliness.

We are pleased to note what the Board of Trade at Regina are trying to do. The following clipping from a recent issue of the Regina *Leader* speaks for itself:

"The Board of Trade considered last evening with disapproval the report that the city council was not inclined to give further consideration to the proposal to erect comfort stations in the city at the present time. This was an urgent need, it was stated, and the civic authorities should proceed with the scheme, even if only along temporary lines. A committee consisting of W. G. Styles, Robt. Martin, D. J. McKay, W. Armour, L. T. McDonald and L. Arnold was appointed to wait on the civic authorities with respect to this matter at once.

"The proposal to construct comfort stations at a cost of many thousands

of dollars was declared to be ridiculous, and the instances of other Canadian cities were quoted where comfort stations had been erected with very small cost. It was a disgrace to the city, it was stated, that no action had been taken in this matter before.

"The question of cost doesn't enter into this matter at all, one member stated, as temporary buildings could be erected for a few hundred dollars. Winnipeg was referred to, where it was stated comfort stations had been erected a number of years ago at a cost of about $1,000 and they were still doing service. The city council should reconsider this matter, it was argued, especially in view of the fact that some time ago money had been voted for this very purpose, so the board was informed."

The Regina Board of Trade should try to put their council to shame by getting an architect to prepare a plan or two, and having a sanitary engineer specify fixtures and general layout, then ask for private contributions to carry out the scheme at least as a start and then no doubt public sentiment would be raised and almost demand that these short sighted councillors be made to see that sanitation and cleanliness spell safety, and stand for prevention of almost every disease known to man. All our medical men are agreed that 90 per cent. of the human ills are directly caused by uncleanliness, and could be prevented.

Making the Most of the Fresh Air Pipe

The Following Article Contains Some Very Novel Ideas—Our Readers Are Asked to Voice Their Opinions, to Discuss the Matter Freely in Sanitary Engineer—No Doubt Much Can be Gained by so Doing.

By Jas. Smith, Chief Plumbing Inspector, Winnipeg.

IN the last three years our minds have to a considerable extent been directed towards economizing material, time, and energy, and it has occurred to me that even in plumbing affairs this old trait in its new development might find some scope.

For several years I have been devoting odd moments to studying out how the fresh-air pipe could be utilized to a fuller extent than it is at present, and in later months the question of economy has cropped up.

I would like therefore to put forward several propositions, so that they may be openly discussed. It is possible there are fatal objections to the proposals I have to make, and which I have not foreseen, therein is the value of your paper.

Size of Fresh-Air Pipe

In all by-laws that I have seen the fresh-air pipe must be not less than 4 inch in diameter irrespective of whether the house drain is 4 inches or 12 inches in diameter, or whether there are 2 fixtures connected with the plumbing system or 200 fixtures. In designing a plumbing system the sizes of the vent and waste pipes have some relation to the work they are proposed to do, but not so the fresh-air pipe. Why therefore cannot we proportion the size of the fresh-air pipe in accordance with the number of fixtures connected with the plumbing system which it serves? For instance, in a small house having from 2 to 4 fixtures there is no reason why the fresh-air pipe should be any more than 2 inches in diameter. In the same way a 3-inch pipe would take care of a plumbing system say with over 4 fixtures and not more than either 10 or 15 fixtures connected to it.

In many cases difficulty is found in satisfactorily disposing the terminal of the fresh-air pipe so that it is a reasonable distance from doors and windows, and if it is to be only a 2-inch or 3-inch pipe it could often be more conveniently taken up a partition and through the roof in cottages and bungalows and finished off in a similar manner to soil pipes.

Increase the Utility of the Fresh-Air Pipe

In a recent issue of the SANITARY ENGINEER the question of back-venting extra fixtures placed in the basements of houses some time after their construction such as laundry tubs and w.c.'s was discussed, and the hardships and difficulties of doing this without tearing pipes out of partitions and breaking a lot of plaster were set forth. In thinking this matter over I see no very good reason why such back vent pipes should not be connected to the fresh-air pipe in such emergency circumstances. Of course I admit that it would be better practice to connect such back-vent pipes to the stack above all fixtures and in new construction this should be insisted on, but the method I propose would meet the difficulty that is encountered daily in existing buildings.

General

The foregoing suggestions would only apply to localities where the house trap and fresh-air pipe are used.

In placing these suggestions before the craft for discussion from every angle I believe they are entirely original and are the result of a sincere effort to meet difficulties which are cropping up daily in our work, i.e., to simplify our plumbing systems as much as possible without affecting their efficiency, and, what is more important, to encourage a more general use of the excellent sanitary fixtures now on the market. If we can satisfactorily dispose the vent pipes say from the waste of a laundry tub in a basement without having to cut floors and break plaster to run a pipe through the roof, not to mention the economy effected in doing so, the public will materially benefit in having the use of fixtures which will tend to create a more sanitary condition of affairs without unduly affecting the proper working of the plumbing system.

AN AUTOMATIC HUMIDIFIER FOR WARM-AIR FURNACES

An adaptation of the Buddington humidifier used on radiators, to warm-air furnaces is announced by the Reid-Geisler Mfg. Co., 5238 Ravenswood Ave., Chicago, Ill. It is stated that one Buddington automatic humidifier, as made for use in furnaces, will moisten the air throughout the ordinary house. The humidifier is connected to the city water supply and automatically refills itself as the water is evaporated. It can be installed in practically any warm-air furnace. It consists of a vitrified enamel evaporating pan which rests on top of the dome over the fire-box, where it gets the maximum heat. This is connected by a water pipe to the water chamber, which is suspended from the ceiling, or placed on a suitable shelf outside the furnace. Inside of the chamber is a float valve which keeps the water level equal in this chamber and in the evaporating pan.

This device is intended to automatically mix just the proper amount of moisture with the heat, operating in direct proportion to the amount of heat generated. It is made in two sizes.

WARNING TO GALT SANITARY ENGINEERS

It is reported that plumbers in Galt, Ontario, have failed to comply with the Waterworks Commission's by-laws, which call upon them to report when they make extensions or connections with the waterworks system, with the result that cases have been found where people have been using water and not paying for it. Notice has been served on the plumbers that if they do not report in future they will be prosecuted.

E. W. Bemis, plumber, Ormstown, Que., has sold assets.

Lieut. D. A. Smith, of Potts & Smith, plumbers, Regina, Sask., has been killed in action.

The Rusting of Iron Pipe in Service

Factors Which Make For Rust Resistance of Metal Pipe Have Heretofore Been Given Very Little Consideration in Most Discussions on the Subject—Qualities of Cast Iron Pipe and Fittings Can Best be Explained on the Basis of Heat Treatment as Being the Only Explanation of Observed Corrosion Phenomena.

By Harry Y. Carson.

THE history of pipe is the history of civilization. Upon no other single product have the great cities of the world depended in such large measure for their health and comfort. The modern city is dependent upon pipe as we are dependent upon arteries, veins and capillaries in human bodies. Let us compare our modern buildings to the individual cells in our body. These cells receive their life-renewing supply of wholesome water through multitudinous pipes, permeating every wall and corridor. After the water has supplied life, bathed and cleansed to its utmost, it carries off the waste products through other capillaries, collecting into larger and still larger main trunk arteries. We are taught that man has a natural life of three score and ten years, but would he not have a life of only five years if his capillaries were constructed to last but that long? If his capillaries were built on the century basis and his arteries on the ten-year basis, what would be the ultimate result?

Cast-Iron and Wrought Pipe Compared.

Pipe made in a rolling mill does not resist corrosion in service so well as pipe made in a foundry. Both kinds of pipe may have been made from the same quality of iron ore: both are smelted and both may have been treated in the same manner up to a certain point in their refinement, known as the "pig iron" stage. The iron which passes through a tube mill must first of all be rendered comparatively free from carbon, silicon, sulphur, phosphorus and manganese before it can be manipulated into thinly rolled sheets for the purpose of making wrought pipe. Paradoxical as it may seem to the layman's mind, the question of chemical refinement plays small part in comparison to other factors. These factors which make for rust resistance of metal pipe have heretofore been given little consideration in the many discussions that have taken place on this subject. Pipe or fittings made of cast steel last quite as well as ordinary gray cast iron in service, but conversely the pipe which may have been rolled out from a cast steel ingot lasts not one-tenth as long as the cast product. Now why should this be so?

Perhaps further light on this very involved question can be found in a recent investigation by a prominent tin plate manufacturer, who tried to ascertain the reason why the old iron links of the suspension bridge at Newburyport, Mass., have so successfully withstood the elements of wind and rain for more than one hundred years, little attention having been given to painting or protecting the metal. In reference to this, the following statement is made in "The Corrosion of Iron," a book published in 1916 by L. C. Wilson:

> To explain how or why these (links) have so successfully withstood the attacks of air and moisture for so many years is not as easy as it might seem for apparently some of our commonly accepted notions and theories as to what a good iron should and should not be do not hold, or at least are offset by other conditions. For instance, some of the links of the Newburyport bridge have been examined and found to be of very ordinary purity and of a most heterogeneous structure, segregation of the impurities being decidedly noticeable. The question of any inherent superiority in the iron itself was settled by heating and rolling one of the links into a sheet and exposing it to the weather, when it was found that it corroded quite as readily and extensively as the rolling mill product of to-day.

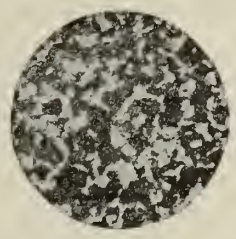


FIG. 1. PHOTOMICROGRAPH OF CAST IRON SHOWING BONDING OF CRYSTALS.

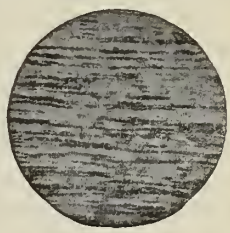


FIG. 2. PHOTOMICROGRAPH OF COLD ROLLED METAL SHOWING LAMINATED STRUCTURE.

Structure of Cast Iron and Rolled Iron

At the top of the chart (not shown), which is a drawing reproduced from a standard text book on metallography, there are indicated the various commercial grades of iron products which are familiar to all. Beginning with the pig iron on the extreme right, it will be noted that the carbon content is greater than 4 per cent. Next comes gray iron, with a carbon content of 3.2 to 4.6 per cent. White iron is next, with a carbon content of 2.2 per cent. to 3.2 per cent. The iron which has a carbon content less than 2 per cent. is known as steel, and this material may be rolled or manipulated, while all other classes of iron must be cast into the desired shapes or objects. Glancing at the extreme left hand side of the chart, the various temperatures at which iron melts and freezes or solidifies may be observed. These temperatures are somewhat lower for gray iron than for steel, and are yet higher for pig iron than for gray iron. However, these very high temperatures, above 2200 deg. F., apply only to the cast irons and cast steels, for when we begin to investigate the temperatures at which steel pipe and wrought iron pipe are made, we must confine our attention to that part of the chart below 1600 deg. F. and between the limits 0 and 0.1 per cent. carbon. This metal is worked at more than 1000 deg. F. below its freezing temperature, and hence does not attain its full crystal growth which can be restored to the internal structure of the pipe only by remelting.

As a result, the pipe so made displays a form of flaking or exfoliation of its particles under the corrosive influence of ordinary service conditions. A very good analogy to iron rusting can be found in the geological structure of various grades of stone found on the earth's surface. Those stones, such as granite, which were molded or "cast" ages ago at a very high temperature are far more durable than such materials as sandstone, which were laid down and cemented together after the earth's surface had cooled to a low temperature. Both kinds of stone may be equally pure in silica and, moreover, we may make from sandstone as sturdy and durable a product as granite, if we but supply a sufficient amount of heat to fuse together the aggregate mass of silica crystals. Figure 1 is a photomicrograph of cast iron, showing the bonding of the crystals.

Contrary to what has so often been stated with regard to cast iron owing its life altogether to a "skin" resulting from the casting process, the author must diametrically disagree for the simple reason that castings have been in service for more than two hundred and fifty years and have shown no greater loss wherever the original casting skin has been totally absent.

The effect of rolling and re-rolling is even more noticeable under the microscope than is the effect upon the internal structure of rolled steel. A bar of metal which is rolled or drawn "cold" will, if the process be carried to the extreme, present a structure viewed parallel to the direction of drawing, like the photomicrograph shown in Figure 2. However, the pipe made from wrought iron is made at a final heat treatment of approximately 1200 deg. F. which gives a

*Read before the American Water Works Association at New York.

fair degree of fusion to the gross slag particles distributed through the skelp from which the pipe is made. The inhibiting properties of this slag, when carefully distributed through the wall section of the pipe, compensates for the low temperature at which wrought iron pipe is rolled. Nevertheless both wrought iron and steel pipe last approximately the same under like conditions of service.

The author believes that the extraordinary qualities of cast iron pipe and of cast iron fittings can best be explained on the basis of heat treatment At least it is the only explanation that seems to coincide with all of the observed corrosion phenomena which are incidents in the rusting of pipe in service.

Theories of Corrosion

The many experimenters who have investigated this subject have evolved at least three different theories of iron pipe corrosion.

The hydrogen-peroxide theory explains the phenomena of rusting by assuming that when iron, water and oxygen are in contact, a chemical reaction takes place in which ferrous oxide, FeO, and hydrogen peroxide, H_2O_2 are formed. Then the ferrous oxide is supposed to react with a portion of the hydrogen peroxide to form a basic or hydrated oxide; rust, an insoluble basic oxide, is the final product.

A second theory, known as the carbonic acid theory, holds that rusting is always started by an acid. It assumes that even a very weak carbonic acid will first convert a portion of the iron into a ferrous salt, with the escape of hydrogen. Under the influence of oxygen and water, the ferrous salt is oxidized to ferric hydroxide $2Fe(OH)_3$. The ferric hydroxide is insoluble and upon precipitation the original carbonic acid is liberated. The carbonic acid is then free to attack more iron and to repeat the process of reducing the iron to rust.

The third, and perhaps most important, theory of iron corrosion is known as the electrolytic theory. It rests on the assumption that when water comes into contact with an iron surface, a certain amount of the iron goes into solution. This small amount of iron carried in solution in the water produces an electrolyte. The process of rusting is then explained by the familiar galvanic electrolysis which takes place between the points of high and low potential on the surface of the metal. The modern conception of the reactions which take place holds that they are accompanied by certain readjustments of the electrical state of the reacting irons and the iron must go into solution as a ferrous iron before it becomes oxidized.

If it were possible to summarize all of the painstaking research that has been carried on by investigators since 1880, we would probably find that one common point has always been mutually agreed upon. It has always been admitted that the iron particles must be in direct contact with oxygen and moisture before rusting can take place. In all likelihood, it is probably close to the truth to say that under varying conditions of service for iron pipe, any one or all of the corrosion theories actually apply during the process of rusting. As for inhibiting or preventing the rusting of an iron pipe line, the problems, both theoretical and practical, seem to sum up in the one proposition of keeping moisture and oxygen from reaching the iron itself. Expressed in different terms, it is the old question of getting a protective coating on all exposed parts of the pipe.

Protective Skin on Cast Iron

There is an entirely different kind of surface rust formation on cast iron pipe than is to be found on the surface of a pipe made of rolled iron and steel. On the surface of a cast iron pipe, whether machined or fractured or not, may be observed a reddish-brown coloured iron oxide which is very hard, and so tenaciously covers the surface of the pipe that it penetrates down between every surface crystal and forms a perfectly impervious coating which is not penetrated by the moisture and oxygen. Hence galvanic action stops on such a surface and the life of the pipe is insured by the very virtue of the oxide itself contained on the surface.

On the other hand, let us observe the surface of a piece of wrought iron pipe or a piece of steel pipe. In this case we see a loose scaling formation of rust which is soft and pervious to moisture and oxygen. These flakes of rust are very readily removed with a pen-knife or the thumb nail from the surface of the pipe. Once the rust scale drops away, the fresh bright particles of the iron are exposed to the oxygen and moisture so that further rusting takes place on each fresh surface until the entire wall thickness of the pipe has been destroyed. The surface scales on wrought iron materials accelerate galvanic action, whereas the rust formation on cast iron has just the reverse quality, namely, the prevention of galvanic electrolysis. The cause for the gradual slowing up of rust action on cast iron seems, therefore, to be thoroughly explained by the quality of the surface oxide.

Plumbing and Wasted Water

The part which bad plumbing plays in the enormous waste of public water is a very significant reason why water works officials should pay more attention to the details of the piping installed in the buildings. The habit has been too common of thinking that the responsibility ends at the corporation cock on the street main or at the meter. That responsibility should not end short of the spigot on each plumbing fixture.

The New England Water Works Association received last year an excellent report on service pipes, in which the following table was given to show the comparative life of some materials which have been used:

	Years Before Trouble Begins	Life of Pipe Years
Plain iron or steel pipe.....	12	16
Galvanized pipe	15	20
Lead pipe	10	35
Lead lined pipe	10	23
Cement lined pipe	14	28

These data are valuable as giving some idea of the amount of water wasted from steel and wrought iron service pipes, which wastes through rust holes in the pipe long before the trouble is detected. Moreover, it becomes difficult to learn the amount of wastage until the line is torn up and replaced. The table also shows that galvanized pipe is little better than black pipe.

Cast iron pipe for service line in the streets as well as for the mains has been installed at low cost, and perfect results can be obtained provided satisfactory joints are used. The minimum size should be 2 inch internal diameter, and this can be laid at approximately the same cost per foot as 1 inch lead service pipes. Nothing will ever reduce the economic loss from wasted water, amounting to $4,000,000 in the United States annually, so much as the general adoption of cast iron pipe with joints capable of remaining permanently tight. Such piping should begin at the pumping station and continue as far as the plumbing fixtures in the buildings. For pipes less than 2 inches internal diameter the material should consist of brass or copper. The general rule should be to use 2-inch cast iron service pipes, but it is not necessary to provide more than a ¾ or 1-inch tapping on the main. The meter may also be of 1-inch size on a 2-inch service pipe without causing any appreciable pressure loss due to friction.

In connecting the service pipe to the street main the present practice of using a short lead gooseneck between the cast iron pipe and the brass corporation cock should be followed in order to provide for settlement and expansion. The service piping must have joints which are flexible as well as tight against pressure. Such a joint is on the market.

The bell and spigot ends of the pipe are machined at slightly different tapers and bolts are used for assembling the joint. When the joints have been made tight against pressures the bolts are usually loosened off, and this construction remains permanently tight, as there is no chance of deterioration either at the joint or at any part of the pipe system. The Underwriters' Laboratories have tested and approved for high-pressure fire service the cast iron piping having this joint.

Did Not Wish To Offend—"John," said Mrs. Mellen to her man servant, "Can you find out, without asking the cook, whether the tinned salmon was all eaten last night? You see, I don't wish to ask her, because she may have eaten it, and then she would feel uncomfortable."

"If you please, ma'am," replied the man, "the new cook has eaten the tinned salmon, and if you was to say anything to her you couldn't make her feel any more uncomfortable than she is."

Sherbrooke, Que.—The City Council contemplate installation of filtration plant.

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OUR DUTY TO THE RISING GENERATION OF MECHANICS

CONSERVATION is the watchword of the hour. Under the stress of present conditions which call for the co-operation of every individual in all walks of life to so conserve his own and the country's resources that we may successfully meet the issues of the moment and those of the future, it is essential that due consideration be given to the perpetuation of such knowledge as each one of us may possess. A fact that must impress every fair-minded person during these revolutionary times is that a greater proportion of the world's work in the near future will be placed upon the shoulders of those young men who have not yet attained their majority. This will become increasingly apparent the longer the war lasts, as the need of more men, and still more men, will continue to make serious inroads into the rank and file now actively engaged in keeping the wheels of industry turning.

There is an old saying that "You cannot have old heads on young shoulders," and while there may be a few exceptions to this rule, it is invariably true, as most of us older ones must admit, that "Boys will be boys" and it is probably well that it is so. Nevertheless, when death and destruction are removing hundreds of thousands of men, who a few years ago were the keystones of the world's industry, it behoves us as waiting reserves, to hand down to the rising generation such tools as will enable it to "carry on" the heavy duties that are even now being placed upon its willing but untried shoulders.

Nowhere is this more evident than in the metal-working spheres of industrial activity, where revolutionary methods are being adopted to replace the efflux of men from all lines of manufacture. Under the stress of existing conditions, it has been found necessary to employ a greater percentage of female labor in trades formerly reserved for males exclusively. These conditions may continue for some time after the close of hostilities, but the post-war readjustments may eventually place the industries back on the pre-war footing, with the extreme likelihood that a large proportion of the future responsibilities will need to be borne by the youth of to-day, who now travels about carefree and unconcerned.

The education of our youths means more than the school training they are now receiving and the subsequent entrance to an engineering establishment to earn a living. The country's future depends very much upon the practical knowledge that the boy of to-day can acquire from the experience of his elders, before the latter pass from the sphere of action. Every facility should therefore be provided to allow him to become familiar with current practice, and his older fellow workmen should not discourage his apparent inquisitiveness in the endeavor to acquire information, but on the contrary should use every effort to instil into the younger mind as much of his own knowledge and experience as the boy is capable of absorbing.

"As the twig is bent, so is the tree inclined." The problem of to-day is to so shape and mould the life and character of the coming men that they may be persuaded to take a deeper and wider interest in the practical business affairs of life, and thus enable them to assume the obligations that circumstances have virtually thrust upon them. The executives of manufacturing plants should not consider the growing boy from the standpoint of earning capacity only, as the early training of every boy is more of a liability than an asset, but should look upon the lad as an essential factor in the ultimate efficiency of the business, and make provision for seeing that the same becomes an established fact. The boy of to-day is the man of to-morrow, and, realizing this, no effort should be spared in making the future man as efficient as possible.

A fault that is only too prevalent to-day is that many men are doing things without the knowledge of why they are done, and while this condition is often more profitable to the manufacturer, it does not tend to increase the productive qualities of the workmen, and may be the means of destroying any initiative they may possess. It does not follow that more time should be spent in instructing men in the fundamentals underlying their daily tasks, as many of the older men are past the age of accepting and appropriating such instructions, but where the boy is concerned it should be the duty of the employer and also his older associates to use every means to advance his theoretical and practical training and thus enable him to better qualify himself for those duties and obligations that the future will undoubtedly have in store.

THE keen sanitary engineer buyer makes a close study of the advertising pages in his trade paper. The selling staff also secure many excellent sales suggestions from the ad. pages. Be prepared for the good times owing to the many new shell contracts and get your share of the prosperity to be handed out.

PRACTICAL SHEET-METAL WORK

THREE PIECE ELBOW WITH GUSSET OR GORE PIECE.

BY THOMAS STANFIELD

THE following article describes a type of ventilator which appears at first glance to be a common one. Many sheet metal workers simply make this top with pieces A C and D, but such tops are little better than ornaments, except that piece A serves as a cover to the pipe D.

The top described in plate 22 is known as an improved Emerson ventilator, the old and original Emerson top was fitted with a flat top, which took the place of the solid cone A.B. It will be noted that the two slanted surfaces B.C. will deflect the air from whatever direction the wind blows, so as to form a horizontal current of air over the top of the open end of pipe D, and not only will this top give satisfaction as a ventilator, but also as a chimney top too.

The first step to take when developing patterns for such a piece of work is to draw the elevation Fig. 1. The size of cone A.B. and flared piece C should be about two-thirds the diameter of the pipe and the cone should have a depth from upper and lower point of about one-quarter its own diameter. Piece C should be flared at a little over twice that of the cone. The perspective view, Fig. 4, shows a fairly well balanced design, which is not only effective, but looks well proportioned.

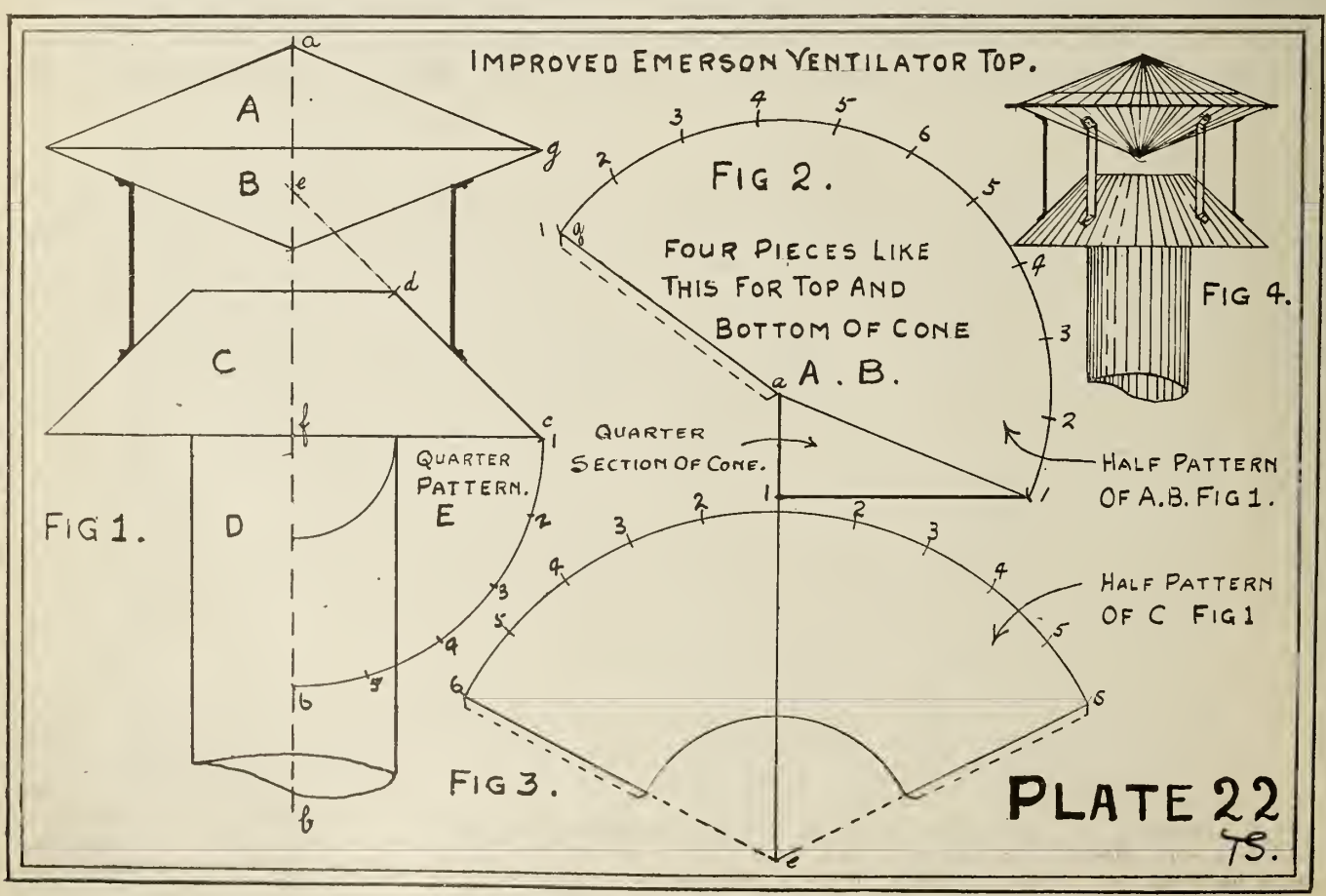
Having drawn the elevation on the centre line a b extend the slant line c d to e on ab as shown at d e, and with e as centre draw a circle, Fig. 3, which is the half pattern of piece C.

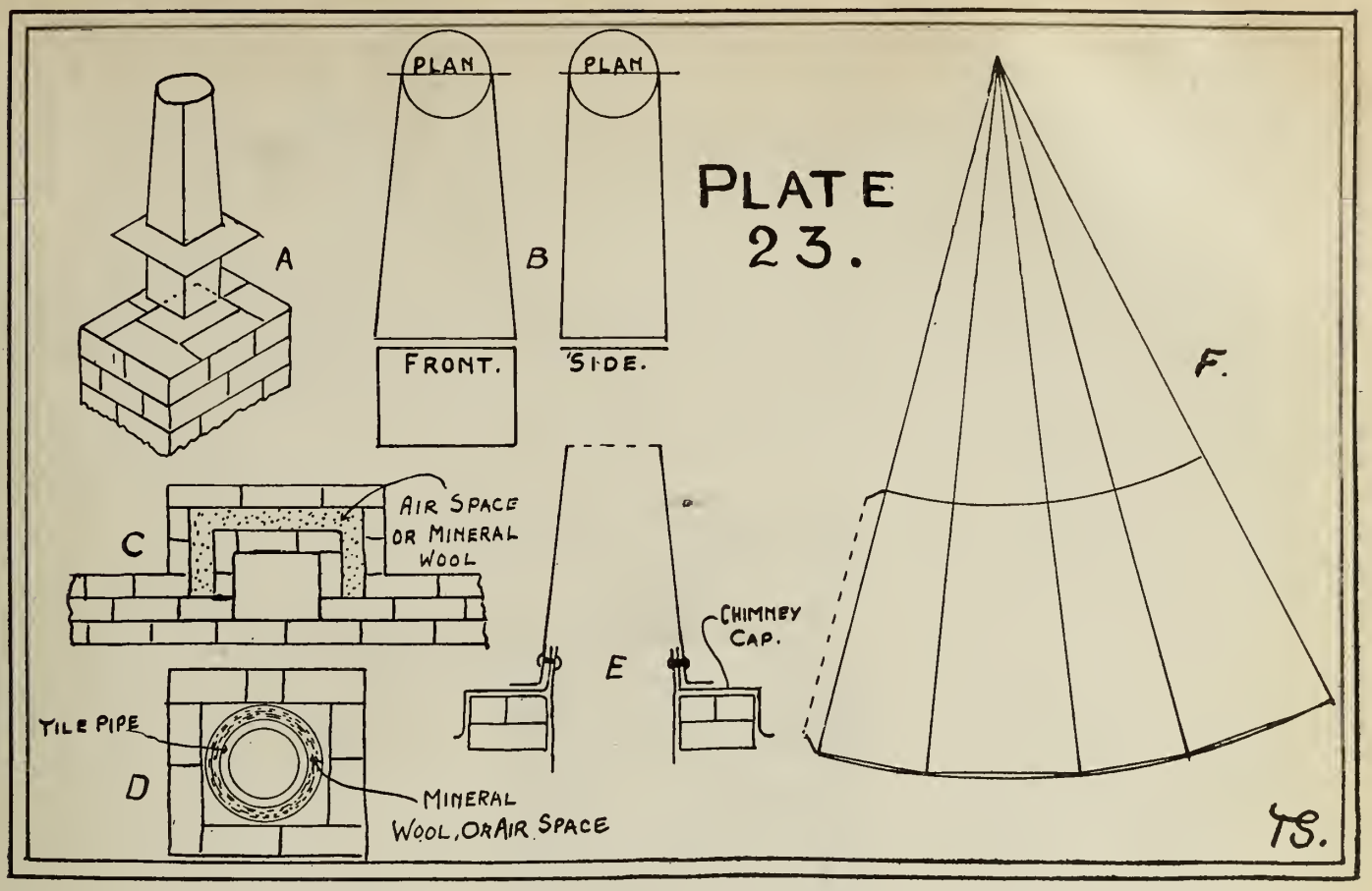
Next place the compass at f and draw two arcs from c to dotted line ab, and divide this arc into five equal parts, 1, 2, 3, 4, 5, 6, and transfer same to arc in Fig. 3, and repeat, beginning with 6 to 1, and 1 to 6. Then by using e on Fig. 1 as centre and d as radius, the half pattern of C is completed except that allowance for locks and seams must be made.

To develop the cone requires two full pattern pieces, one should be at least one-quarter of an inch larger all round to allow for seam.

Place point of compass at a, and with g as radius draw an arc as shown in Fig. 2, and transfer the measurements from quarter pattern E, Fig. 1 to Fig. 2, as shown, beginning at 1 to 6 and 6 to 1. This will only give pattern for one half of the design which means that four pieces like Fig. 2 are required to make a cone.

The quarter pattern shown at E in Fig. 1, is simply a round flat flange





which forms the lower half of piece C. No seam allowance is needed for this pipe as it should be fitted to the underside of C, and C should be made large to enable it to be placed over piece E. Plate 22 is almost self-explanatory and requires no further description.

Plate 23

In plate 23 a number of illustrations appear in connection with chimney caps and chimney construction. In our Canadian climate more care should be exercised when building chimneys. Many a furnace is installed that, do what one may, will never burn properly, and will not give off enough heat. When an extension to a chimney is made by adding a galvanized pipe as shown at A plate 23, it should be installed in such a way as to protect the chimney top.

Fig. C shows how a chimney may be protected from cold and made much more effective if constructed in manner shown. It will be noted that where a chimney projects out from the building line, at least one-half of the chimney is too much exposed, and particularly so when simply a single brick is built up on the outside.

An air space or mineral wool coating should be by right inserted in such a chimney and it would result in better draft and less fuel consumption. Fig. D shows another design of chimney which is a very effective one, and one that is becoming very popular. It is a well-known fact that a round chimney is much more efficient than either a square or rectangular one.

Then again with a round pipe chimney that is smooth as well as furnished with an air chamber its effectiveness is greatly increased as stated before, when an iron extension is placed on top. In this case there should be some protection for the brickwork, because winds and vibration caused by heavy traffic, etc., will very often cause the top layers of masonry to become loose. Fig. E, shows how a chimney may be protected.

Fig. F, is a full pattern of extension pipe shown in Figs. A and B, and is self-explanatory.

In conclusion the writer is of the opinion that one of the most important conditions precedent to a furnace being installed is to be thoroughly satisfied that the chimney is suitable for the furnace, and seeing that this work is done long before the furnace is installed, it is often necessary to decide upon the style of furnace before the chimney is built.

(Continued in next issue.)

ADVANTAGES OF OIL FUEL LOCOMOTIVES

By O. C.

IN the case of a locomotive burning oil fuel, the fire can be instantaneously adjusted to suit the load, which varies almost from minute to minute with the speed and gradient. So perfect is the control that the steam pressure can be maintained inside a total variation of five pounds with changes in load of 50 per cent. and over. An important feature is the rapidity with which a head of steam can be obtained; an engine can be moved under her own steam within 35 minutes of the full oil-burners being lighted. The practice on railways using oil is to have a stationary boiler always in steam at each round house, from which connection is made to the dead engine through a three-way cock in the steam pipe leading from the steam stand on top of the fire-box to the burner. By this means the burner can be started from cold until there is sufficient steam generated in the engine itself to keep the burner going.

The advantages of the use of oil are specially noticeable in the round house or shed when squaring up after a day's work. There are no fires to be raked out; no flues or soot boxes to be cleaned; no coal to be stacked, weighed or otherwise handled. A saving in cost of equipment is represented in the absence of fire-rakers, flue brushes and shovels, all of which are unnecessary on an oil-burning locomotive. Further, when engines are engaged in switching and shunting operations, they frequently have to stand idle under steam for hours at a time. The burners in such cases can be cut down to the minimum, or even extinguished, as an engine will always retain sufficient steam to start up the burners again when required.

Importance of Humidity to Health

Being the Opinions Expressed by Persons Who Have Experienced the Benefits to be Acquired in a Home Where Humidifiers Are in Operation—This Article is Full of Good Selling Hints

Written specially for "Sanitary Engineer" by H. L. Seymour, B.A.Sc., A.M. Can. Soc. C.E.

ARTICLE 3.

ADVERTISING literature setting forth the claims of various manufactured devices for increasing the amount of moisture in the air shows that for some time means have been provided for humidifying the atmosphere in large buildings, and especially in factories manufacturing certain articles.

Commercially, humidity in the air has been recognized as a necessity—in the manufacture of cotton, silks and textiles, in bakeries, and in the manufacture of tobacco products. Under such conditions a proper consideration of humidity means a direct financial return. Therefore, humidity is considered. The financial return through the conservation of human life, though as real, is not so obvious. Because the human body is the toughest machine made and can run for a long time with lack of attention that would ruin an ordinary machine, its necessities are often overlooked. In artificially heated rooms moisture in the air is as necessary for the human body as oil is to a machine. Yet a proper amount of humidity has not been given much consideration in the home and office, where the great majority of us have to spend a great part of our time.

But people are gradually waking up to the advantages of moist fresh air. Consider the following advertisement appearing this fall in a Canadian city paper:

ATTENTION

If you are not getting satisfactory results from your heating apparatus investigate the merits of —— moist air system. Can be used in conjunction with your present hot air, hot water or steam furnace. Supply from three to five thousand feet of fresh outside air per hour sufficiently humidified. Saves fuel and increases the capacity of apparatus from 25 to 50 per cent.



The "Trico" Humidifier.

If every efficient heating engineer will turn his attention to this important matter we can safely prophesy what one enterprising heating concern has printed for a slogan on its literature dealing with humidity: "Revolution! The End Attained at Last!"



Fig. 2.—Filling the "Trico" Humidifier

If two thermometers are placed side by side in a room, and around the bulb of one of them there is placed a cloth of absorbent material, one end of which is in water, then this latter "wet" bulb thermometer will under ordinary conditions record a lower temperature than the "dry" bulb thermometer. The drier the air, the greater will be the difference between the two thermometer readings; only when the air is saturated will they record the same temperature. This is due to the fact that when air is not saturated with moisture, water evaporates from the wet cloth. This requires heat—(about 1,000 B.t.u. is required to evaporate a pound of water)—part of which is taken from the bulb of the thermometer, thus reducing its temperature. This very interesting property is made use of to measure the amount of moisture in the air. Tables and charts have been prepared showing the amount of moisture for different dry temperatures and for various differences between "wet" and "dry" temperatures.

It becomes a matter of further interest when it is realized that in our artifically heated winter homes we ourselves are really "wet" bulb thermometers!

We lose normally every hour about 400 B.t.u.—(a pound of coal in burning gives out about 8,000 effective B.t.u.). If more heat than this is abstracted from the body a person begins to feel cold; if less heat is lost, a person begins to feel hot. By radiation, convection and evaporation heat is lost from the body mainly by way of the skin. Whether the air is moist or dry has a great effect on the body heat loss by evaporation, which has been stated as being generally about 21 per cent. of the total heat loss. In this important respect, therefore, we resemble the "wet" bulb thermometer.

In a room with a temperature of 65° Fahr. and a humidity of 60 per cent., the "wet" bulb thermometer would read 57° Fahr. This (57° Fahr.) is then approximately the temperature a person in the room actually experiences or feels. The same "sensible temperature" of 57° Fahr. is obtained when the dry bulb temperature is at 75° Fahr. and the humidity is 30 per cent. This proves the statement that the temperature in a dry room can be reduced for comfort about 10° Fahr. if plenty of moisture is added.

In the preceding article some devices for humidifying the air were explained where the evaporation took place below the boiling point of water. Other devices of this nature will be now explained.

The "Trico" Humidifier

This (see Fig. 1) is a patented device in the shape of a shelf or seat fitted with a water container. It is made entirely of metal and in various sizes, and can be attached to any upright radiator, no matter what heating system is used. The humidifier can be fastened to the radiator by means of strap irons drawn tight with bolts.

Under the seat top there is a long, flat water container with perforations at the back along the top edge, and a quarter of an inch space is allowed for a circuit of air to come through the perforations and



Fig. 4 shows how this appliance is attached to radiators.

pass out at the front, saturated with moisture, to arise with the heat.

The humidifier proper, the reservoir or water container, is a large, removable, concealed, heavy galvanized metal tank of No. 24 gauge, 1¼ inches deep and extends over the entire length and width

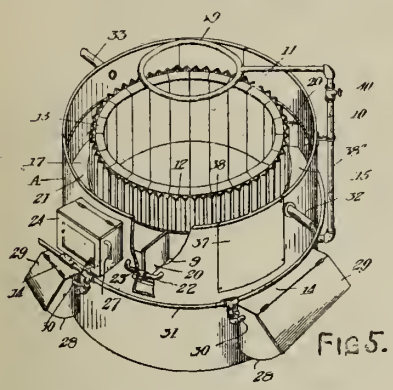


FIG 5.

of the radiator, allowing a large evaporating surface. It is located on the top of the radiator and is constructed so that part of the air heated by the radiator passes through the perforations and over the water's surface, carrying the rising vapor through the front aperture, where it mixes with the rising hot air. The method of filling the reservoir with hot or cold water is illustrated in Fig. 2.

The top is constructed of No. 12 (⅛-inch thick) gauge, pickled steel, and the front and back are flanged downward 1¼ inches for rigidity and strength. An art metal finish is baked on this top.

The back is one piece of galvanized iron, flanged one inch at the ends and bottom; it extends the entire length and height of the radiator, acting as a shield in protecting the wall decorations or drapes above the radiator, and also acts as a deflector, throwing the heat out into the room. The brackets are of plain design to conform with the radiator.

Besides acting as seat or shelf, a protecting shield, a heat deflector, and mainly, of course, as a humidifier, the "Trico" would appear to have advantages from a decorative point of view.

The Eureka Humidifier

The main feature of the "Eureka" humidifier (see Fig. 3) is an absorbent stone composed of ground stone and charcoal. A pan is placed at the bottom of this stone in which the water supply is kept. This pan is filled by means of a funnel which runs to the top of the stone from the pan. A galvanized frame connects the stone, pan and funnel. All metal parts are painted with aluminum paint to prevent their rusting.

Another feature claimed for the "Eureka" is its dehumidifying property. Placed in a room with too much moisture (a condition practically never found in the average home) the stone, it is stated, will absorb instead of give off moisture.

It can be placed out of sight at the back of any ordinary radiator, supported by hooks provided for that purpose (see Fig. 4).

Such a humidifier might evaporate from one to two quarts per day, depending on the size of the room in which it is placed.

This (see Fig. 5) is a humidifying apparatus designed to be put under any hot air, hot water or steam boiler already in use (see Fig. 6), as well as for new installations. There are other desirable features claimed for this apparatus, which, if they work out satisfactorily, should make the M.M.O'C. base very popular.

In the first place, the base, made up of heavy galvanized iron and lined with fire brick, has no grate. It is in effect a "Quebec" heater. Those who have had experience with Quebec heaters well know their advantages as well as the possible difficulty of getting out all the ashes satisfactorily. In the M.M.O'C. base there are numerous doors by which the ashes can be taken out, thus solving the ashes difficulty. To eliminate dust, each ashpit doorway is supplied with a perforated pipe (30), which extends across the doorway (14), and is connected to the city water main or pressure tank system. Before cleaning out

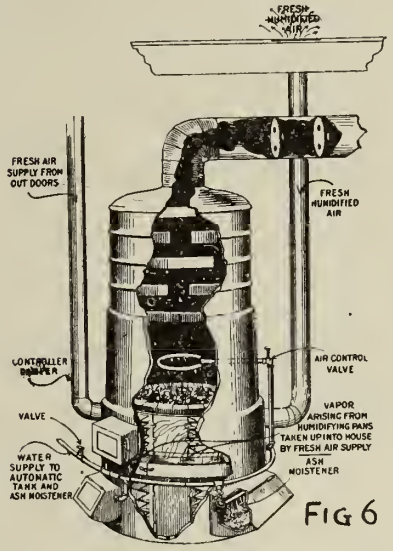


FIG 6

ashes, valve (30) should be opened and a curtain of water will immediately be sent across the ashpit door, which will moisten the ashes.

Air for the combustion of fuel is taken in through door (29) and raised, it is claimed, in the annular preheating chamber surrounding the lower portion of the walls of fire box, to a temperature of several hundred degrees before it comes in contact with the fuel. This preheating chamber is also provided with a pipe which leads to a perforated ring (39), and this ring is located above the fire so that pre-heated air from the chamber (16) will on issuing from the perforations be projected on the burning fuel. The flow of air is controlled by the valve (40) on pipe (38a). Having the air at a high temperature before it comes in contact with the burning fuel is generally claimed to cause a considerable saving in fuel. Readers of the SANITARY ENGINEER are probably familiar with similar devices for attaining such a result.

As to the humidifying properties of the apparatus, the inventor's claim is as follows:

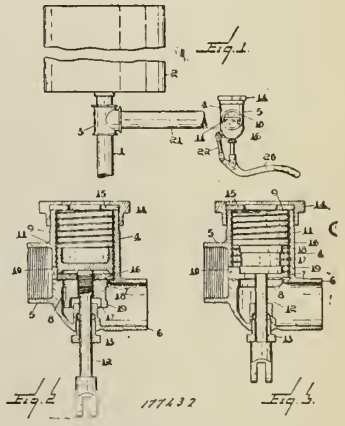
"Air also enters the upper chamber (17) through the inlet pipe (33), and, coming into contact with the baffles (36) —(it is understood these may be, and at present generally are, omitted)—is broken up into a plurality of streams which are heated by contact with the walls of the said chamber, while this air circulating above the water (kept at a predetermined level by an automatic tank not shown in Figs. 5 or 6) in the pans (21) takes up the desired amount of humidity which has a discharge pipe (32). . . . . The flow of this air through the chamber (17) may be controlled by regulating valve (34). . . . . This means that the heat units that would otherwise be lost are used for heating the fresh air, vaporizing the water for humidifying purposes, and pre-heating the air for combustion of fuel."

NEW PATENTS

No. 177,432.

Stafford W. Menzies, Sarnia, Ontario, Canada, 5th June, 1917; 6 years. Filed 9th March, 1917. Receipt No. 276,710.

Claim.—A valve casing having an inlet chamber, an outlet chamber, and a port connecting said chambers, a valve seat surrounding said port at the inlet side thereof, a cylinder formed in alignment with said seat and above the same, a piston loosely fitted in said cylinder, a valve washer carried by said piston adapted to seat on the valve seat aforesaid, a stem on said piston extending downward through the casing, a throttling member forming a downward extension from the piston, said throttling member being of materially less cross sectional area than and normally extending below said port and having at its end adjacent the washer an enlargement to nearly close the port when the washer is almost down to its seat, said throttling



No. 177,432. Flushing Valve.

member also having a second enlargement at its lower end, said second enlargement lying below the port when the valve is closed and entirely above the port when the valve is fully open, and a stuffing box on the casing through which the said stem passes.

Overhead Expenses and Profits

Being the First Part of an Address Given at the Regular Monthly Meeting of the Toronto Society of Domestic, Sanitary and Heating Engineers on Overhead Expense and Profit.

By Garrett F. Frankland, Secretary of the Ontario and Toronto Societies of Domestic Sanitary and Heating Engineers.

BEFORE I proceed with the second instalment of this address on overhead expenses and profits, I would like to ascertain how many of you have given any thought to my previous message of last month. Have any of you gone even further than that, and compared the list of items as found in the imaginary plumbing and heating business as described to you last month, with your own particular system of booking or have you all ignored the matter entirely?

If one or two of you have thought over this matter it will to my mind repay the time and effort spent in compiling and placing before you some of the particulars embodied in these talks.

I only wish to impress upon those of you that have shown no noticeable interest in bookkeeping to date that the day is coming, and coming faster than you imagine, when you will reap your reward of regret and failure. I may say this in all fairness to yourselves, because I see every day men of our craft coming more to the front who have adopted a sound system of bookkeeping in their business and who are endeavoring in every way possible to improve their methods, and apply their efforts in appealing to the public for their patronage.

You can rest assured, that when a member of the plumbing and heating trade begins to be successful that he is attending to his cost of doing business, which is just what overhead expenses are.

The question of profits in our particular line of business is one of vital importance to every one of you. Each of you are primarily in the business to make money, and while you may think that is what you are doing let me tell you that not 10 per cent. of the entire trade throughout our Dominion are making money, simply because they ignore overhead expenses entirely, or else do not figure every item.

Therefore you will readily agree with me, if such is the case, that you must soon begin to give some attention to the matter of figuring your profits correctly, if we are to become successful businessmen, and earn the respect of the public.

To bring us to a point where we would agree in a general manner as to what our cost of doing business is, allow me to refer you to the list distributed amongst you this evening. These figures were included in Chart No. 1 which you received at our last meeting.

I will assume that you all agree with me, that the figures arrived at in our first talk were correct. That on an annual turnover of $15,000.00 cost of operation showed $3,932.00, or in other words on every dollar of our annual sales it cost over 26 cents before we had any profit for ourselves.

Now, if we agree that the above is correct, we must also agree that in the remainder of each dollar, there is included the item called profit, and also the first cost or invoice cost of your merchandise, be it material or labor as the case may be, though I find that there are those engaged in our business who are exponents of the idea that cost begins and ends with the invoiced amount of their material, and with the amount they pay to their journeymen per hour or week. I trust that none present are in that class, but you will readily recognize those of whom I speak, and all I can say in their behalf is that their own ignorance will find them out sooner or later.

Some will ask, what is profit? Profit is the return from the employment of capital after all charges for labor, interest, depreciation, selling expense, and other expenses of your business have been acounted for and deducted.

Remember this, the difference between the buying price of an article and that which you receive as the selling price is not all profit.

What I contend is that every one engaged in the plumbing and heating business who does not figure properly is nothing more or less than a gambler or in other words a handbook man, taking the chances, and giving long odds to the public, on every occasion when they are called in to give an estimate for some work.

How many of you have estimated your material and labor on many a plumbing and heating installation, and never

Table for Figuring Net Profits

If Your Cost of Doing Business Figured on Sales is Represented by One of These Figures

And You Mark Your Goods at One of These Percentages Above Delivered Cost.	%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	21%.	22%	23%	24%	.25%
	25	10	9	8	7	6	5	4	3	2	1	00	1 Loss	2 Loss	3 Loss	4 Loss	5 Loss
	33⅓	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	00
	40	18⅔	17⅓	16⅔	15⅓	14⅓	13⅓	12⅓	11⅓	10⅓	9⅓	8⅓	7⅓	6⅔	5⅓	4⅓	3⅓
	50	23⅓	22⅓	21⅓	20⅓	19⅓	18⅓	17⅓	16⅓	15⅓	14⅓	13⅓	12⅓	11⅓	10⅓	9⅓	8⅓
	60	27½	26½	25½	24½	23½	22½	21½	20½	19½	18½	17½	16½	15½	14½	13½	12½
	75	32⅛	31⅛	30⅛	29⅛	28⅛	27⅛	26⅛	25⅛	24⅛	23⅛	22⅛	21⅛	20⅛	19⅛	18⅛	17⅛
	100	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25

Your percentage of net profit is represented by the figure at the junction of the two columns

EXPLANATION—If the cost of doing business is 15 per cent of your gross sales and you mark a line at 25 per cent above cost, your net profit is 5 per cent on sales—as shown in the diagram. If the cost of doing business is 18 per cent and you mark a line at 60 per cent above cost, your net profit is 19⅛ per cent on sales.

thought of adding more than 10 per cent. or 15 per cent. at the most to your estimate of quantities, and termed the addition profit. I leave it to you as to whether it was profit or cost, and before you were half way through the job, you were doing all you possibly could to skimp it in some way or other, so that you could eventually finish the contract, without being too deep in the hole.

Here is an example of the easy manner in which "profit" disappears, and one that no doubt you have all experienced in your own businesses. (I know that I did). You have been called in by a real estate agent, who proceeds to tell you what a lot of properties and estates he has charge of, and that he requires the services of a good wide awake plumber to attend to the necessary repairs as they come along. That you had been recommended to him—but you all know the song. He explains how he is to be allowed 10 per cent. commission on all your accounts, and you clapped yourself on the back at the thoughts of coming profits, or shall we say that it was only the joy of securing more work to keep you busy. After rendering the first batch of accounts, you realized that you could not afford to allow the agent 10 per cent. commission out of your usual charges. So to the next acounts you added on 10 per cent. throughout, with the result that for one month we will say your total account was $100.00 to which you added 10 per cent., making your statement read $110. In the course of time a cheque was received from Mr. Agent for $99, and, for the life of you, you could not understand by what right Mr. Agent deducted that extra dollar, over the ten dollars you had added to the account for his 10 per cent. commission. I take it that it gradually soaked in that Mr. Agent was helping himself to his agreed upon 10 per cent. on your total account and not alone on the amount of your original cost or charge. The above will illustrate how easy it is to rob yourself of your profits, and, take it from me! I have yet to meet the man engaged in the plumbing and heating business who in any way robs the public. I find it is always the man himself that is being robbed, and invariably by himself.

The above reminds me of an incident that occurred previous to the time of my entering upon my apprenticeship. A couple of fellows opened a shop next door to where I was working at the time, and in due course of time the sign painter arrived to place the name of the firm on the window. He managed the name all right, but, when he came to the particular distinguishing mark that was to place those in this particular business before all the world as something entirely different from who had gone before, he got stuck.

I remember well a consultation taking place outside the store between the local butcher, grocer, stationer, the two plumbers, (for this was to be a plumbing shop), and the sign painter as to the proper way to spell the word "conscientious." These were to be "conscientious plumbers," but if I remember rightly they lasted about two months, and then closed their doors on a unappreciative public.

In reciting the above incidents I only wish to bring to the mind of all in our craft, that the majority engaged in our business either do not know what profit rightly stands for, or will persist in making themselves believe that everything other than first invoice and labor cost is their profit. I also have no doubt that the majority of those engaged in our business are entirely at sea when it comes to the question of percentage of profit as against percentage of cost in their own affairs. No doubt in numerous cases this comes about through lack of knowledge in the first instance, as well as lack of any method of book-keeping or records of sales or purchases, and, in the case of the rest, from the lack of a correct knowledge of per cent. I question if five out of every hundred engaged in our business could sit down and agree on the proper method of arriving at the correct per cent. to be added to their merchandise to give them a stated profit. Remember I do not want my hearers to think that I profess to know it all, because I do not by any means, and it is only through constantly reading articles on this selfsame subject that I am accumulating knowledge along this particular line. In doing this you would be surprised at the variance between the numerous authorities in their methods of arriving at the ultimate decision as to what profit really is.

The foundation of every successful business is the ability to sell merchandise at a profit above the distributive cost, and the superstructure is satisfied customers. Therefore you should sell your merchandise at a rate of net profit which will protect you from loss, and at prices satisfactory to your customer. In arriving at your selling price, you must consider three items or factors, viz.: The cost of the merchandise; the cost of selling the merchandise, (your overhead expense); and the net profit you desire on the merchandise.

In conclusion allow me to refer again to Chart No. 1, wherein we arrived at 26 per cent. as percentage cost of doing business. Let us say that it was 25 per cent., to make it even figures, as I wish to show where we come in on my second chart, No. 2, which only goes to 25 per cent.

Chart No. 2 is a table for figuring net profits, and I want you all to take same into your most earnest consideration, and come prepared at our next meeting to state whether you agree or disagree with the figures shown in the table.

ONE day an ammunition dump blew up. Cordite was blazing, shells and bombs bursting, and splinters and whole shells flying everywhere in the vicinity. The atmosphere was full of smoke and resounding with metallic whines. Out of a shack hard by came a darky loaded to the waterline with kit, blankets, rifle, etc., and up the road he dangled.

"Here! Where are you going?" shouted an officer.

"I ain't goin', suh," panted the darky. "I'se gone."

WHAT "HORSE-POWER" MEANS

Of course it has something to do with horses—that term horse-power, which is used so glibly in talking of automobile and other engines. But what? Assuming that your thirty-two horse-power engine really does the work of that many horses, how do you know? How does the company that makes the engine know?

It appears that the term originated with James Watt, the father of the locomotive, who, in inventing the steam engine, had also to invent a way of selling it. Nearly every appliance of his time, some hundred and fifty years ago, was driven by a horse, and it occurred to Watt that the best way to convince a prospective customer was to describe his steam engine as being able to do the work of so many horses. His first task, however, was to find out just how much work a horse could do; and Waldemar Kaempffert says in "McClures":

"Watt found that the average Cornish mine-horse, used for pumping water, could lift a weight of 150 pounds at the rate of two and one-half miles an hour for ten hours a day. Reduce that to minutes and feet, and your calculations show that a horse can lift 33,000 pounds a foot in one minute. This, then, was his measure of a horsepower—33,000 foot-pounds a minute. When Watt guaranteed that a pumping engine of his would develop fifty horse-power, he meant that it would lift fifty times 33,000 pounds one foot in one minute. Modern engineers, however, are not satisfied with the Watt test. It is both too liberal and too stingy—too liberal because a horse can't keep up the pace Watt assumed all day and too stingy because he can do better in a single, favorable minute. But his figure has come down to us, and it is still used for expressing the mechanical capabilities of a swift passenger locomotive, of a giant ocean steamship, and of millions of automobiles."

When an automobile manufacturer guarantees that his engine will develop fifty actual horse-power, how does he know? Of course he doesn't keep fifty horses on hand to compare with the actual performance of his engine. Yet he does something very similar, and with far greater accuracy. For instance:

"When a grocer weighs out five pounds of flour he does not have to balance the flour against a real five-pound weight. He can make the flour pull on a spring of known strength, and the spring in turn causes a pointer to swing on a graduated dial so as to register accurately the amount of pull in pounds. An automobile engineer arrives at the horsepower in a similarly convenient way."—"Valve World."

Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

ONE of the important changes to be recorded since last issue has been that in conductor pipe, eavetrough, valleys, bridge rolls, elbows. Solder has been another important line to take on additional firmness. The situation in solder has been caused by reason of the position in ingot tin. Supplies of ingot tin on this continent are very light and additional stocks are not being brought forward. For some reason unknown as yet the British Government has been refusing to grant permits to ship tin from her ports. This has caused a shortage of tin, both in the United States and Canadian markets. In the local market tin has made big advances and prices have gone equally as high in the New York market. Pig lead has been holding steady in price for some two or three weeks. Spelter will in all probability take on a firmer trend if curtailment of output continues in the United States producing fields. One of the largest smelting plants in the United States has curtailed its output to the extent of two-thirds its capacity.

Some readjustments have taken place in the price of black and galvanized sheets. Range boiler manufacturers are having difficulty in getting the heavier gauges used in the ends of the boilers, as there is an embargo on heavy sheets coming from the United States. Business with wholesale plumbing goods houses is reported fairly good. Valves continue to be one of the active lines in transactions now taking place.

TORONTO, Nov. 28. — Manufacturers of wrought iron pipe report that the situation with respect to getting supplies of raw materials has improved considerably within the past two weeks. Skelp mills in the United States are supplying their needs more freely, and Canadian manufacturers are now able to keep their mills running more nearly to capacity. This does not mean that they are running to capacity by any means, but there is a noticeable improvement brought about through their ability to get better supplies of raw materials. Labor conditions still continue to handicap them to a certain extent. Heavier sizes of pipe will in all probability be obtainable with a little more ease than they have been for some months past. This is the season of the year when building operations are at a low ebb and all lines connected with the plumbing trade naturally take on the quietness of the period. Anticipations of a good building season next year are expressed in numerous quarters connected with building supplies of various kinds.

Demand For Range Boilers Reported Fair

RANGE BOILERS.—There is a fair demand for range boilers at the present time, but manufacturers are still restricted in their operations in that the vails. These sheets can only be obtained embargo on heavy steel sheets still prewhen it is shown that the work in which they are used is going to further the military efforts of the Allies. If there is not some improvement in this situation ere spring the manufacturers are at a loss to know what shift can be made to supply the demand for range boilers, which it is anticipated may develop at that time. Prices in range boilers held unchanged.

	Standard	Extra Heavy
30-gallon range boilers....	$13.00	$17.00
35-gallon	17.00	20.50
40-gallon	20.50	24.00
52-gallon	28.00	32.00

Situation In Iron Pipe Shows Improvement

WROUGHT PIPE.—Manufacturers of wrought iron pipe state the situation with respect to getting raw materials has shown considerable improvement during the past two weeks, and that they are now permitted to operate their mills to fuller capacity. It is not meant to convey the impression that they are operating to full capacity. However, the skelp mills in the United States have been releasing larger quantities of raw material, and the situation has improved greatly. Manufacturers evince some satisfaction over the turn that affairs have taken. Larger sizes of pipe will perhaps be obtainable with less difficulty than in recent months. Prices held unchanged according to the July 5 list. Demand for pipe is fair.

Look Forward To Good Building Year

ENAMELWARE. — Some interests closely connected with the building trade are looking forward to a good building year, starting with next spring. They base their belief on the fact that there will be good industrial conditions as a result of munitions orders and shipbuilding that will be carried on throughout Canada. Industrial centres will continue to grow in population, and with the comparatively light building operations that have been going on for the past three years there will be a pronounced need for new dwellings. With such a condition the enamelware trade and kindred plumbing trades should feel an immediate benefit. At the present time there is quietness in trade, as this is the season of the year when a slack time is looked for.

Bath-tubs, roll rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bath-tubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple.....	16 80
Closets, oak tank and seat	22 00
Do., enamel iron or white vitro tank...	23 75

Market For Soil Pipe And Fittings Quiet

SOIL PIPE, FITTINGS.—The market for soil pipe and fittings is in a quiet period incidental to this season of the year. Prices held unchanged. Demand was more of a sorting nature to complete small jobs. Following are the quotations:

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	....	15%
Cast elbows, tees, etc.	....	15%
Plugs	....	30%
Bushings	30%	33%
Flange unions, standard	....	20%
Dart unions, ¼-inch to 2-inch.....	20%	25%
Do., 4½ in. and larger	....	15%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4-in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.....	0 50	0 63
Do., Class B, lb. net.....	0 22	0 33
Do., Class C, lb. net.....	0 15	0 22

Now Beginning To See Daylight

VALVES.—Manfacturers of valves are now beginning to see daylight as regards getting some of the accumulated orders out of the way. Makers of valves have been running to capacity for months past owing to the demand for valves for industrial purposes. Factories are still busy and orders continue to

come in at a good rate, but manufacturers have now arrived at greater efficiency in getting the work completed and out of the way. Prices held unchanged during the time since last issue.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard.	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	Net
Globe, angle and check valves, standard.	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Oakum Quotations Held In Steady Position

OAKUM.—With the lightness of building operations at the present time the demand for oakum is also light. Some few sales continue to be made in small lots, but purchases of larger quantities are somewhat conspicuous by their absence. Prices held unchanged.

		Per 100 lbs.
Best American	....	$21.50
U.S. Navy unspun	....	20.75
Plumbers' spun	$8.50	10.00

Solder Firmer With Higher Prices Recorded

LEAD AND ZINC PRODUCTS.—There was a firmer situation in solder during the week as a result of the strong position of tin. Jobbers advanced their prices in some quarters, making the range on guaranteed solder $38.75 to $45 per hundred pounds and on strictly from $38.25 to $40 per hundred pounds. Wiping solder also showed a higher range. The difficulty in getting tin into the Canadian market has operated to send ingot tin to new high levels. At the present time there is no relief in sight as the British Government is withholding licenses to ship tin. Demand for these products is somewhat light. Other products held unchanged.

Lead pipe, lb.	$ 0 15	....
Lead waste pipe, lb.	0 16	....
Lead traps and bends	10% on list	
Lead wool, lb.	0 14	0 18
Lead, caulking, lb.	0 10	0 12
Lead sheets, 3 lbs. sq. ft.	0 14	0 16
Lead sheets, 3½ lbs. sq. ft.	0 14	0 16
Lead sheets, 4 to 6 lbs. sq. ft.	0 14	0 15

Cut sheets, ¾c lb. extra and cut sheets to size, 1c lb. extra.

	Per 100 lbs.	
Solder, guaranteed	$38 75	$45 00
Solder, strictly	38 25	40 00
Solder, commercial	36 00	38 50
Solder, wiping	34 80	36 00
Solder, wire	40 70	41 00
Zinc sheets	26 00	.....

Further Readjustments In Sheet Prices Take Place

SHEETS, PLATES.—A further readjustment in the price of black sheets has taken place during the week on the part of some concerns who were quoting at prices above the lowest quotations. On 3-16-inch plate there has been a readjustment in the downward direction to the extent of $1 per 100 pounds, making the quotation $12.25, while ¼-inch boiler plate has also been moved lower to $12 per 100 pounds. There was a slight sag in the price of galvanized sheets in one quarter, the decline amounting to 25c per 100 pounds. For 10¾ oz. the price is now $10 in certain quarters; $9.70 on 28 gauge, $9.40 on 26 gauge, $9.25 on gauges 22 to 24, $9.10 on gauges 18 to 20, $8.95 on 16 gauge, and $8.85 on No. 14 gauge. Quotations in other quarters held unchanged from those given last week.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917.

Standard Buttweld.

	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 5 00	$ 6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00

Standard Lapweld.

2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES.

4" and under, 45%.
4" and under, running thread, 25%.
4½" and larger, 40%.

STANDARD COUPLINGS.

4" and under, 35%.
4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces.

BLACK SHEETS—	Per 100 lbs.	
10 gauge	$	$12 00
12 gauge	8 05	11 60
14 gauge	7 95	9 90
16 gauge	8 00	10 00
18-20 gauge	7 80	8 80
22-24 gauge	7 85	8 85
26 gauge	7 90	8 90
28 gauge	8 00	9 00
29 gauge	8 10	....
3-16-inch plate	....	12 25
¼-inch boiler plate	....	12 00
GALVANIZED SHEETS—		
10¾ oz.	$10 00	$10 30 $12 00
U.S. 28	9 70	10 00 11 70
U.S. 26	9 40	9 70 11 40
22 and 24	9 25	9 55 11 25
18 and 20	9 10	9 40 11 10
16	8 95	9 25 10 95
14	8 85	9 15 10 85

Corrugated Sheets Have Moved Higher

CORRUGATED SHEETS.—It was intimated in these columns last week that an advance on corrugated sheets was highly probable; such advance has been recorded and amounts to 30c on No. 28 gauge and 40c on No. 26 gauge. This comes as a result of the fixing of the prices in the United States with the realization on the part of dealers that there will be very little additional stock of plain sheets available for the Canadian market. The price of No. 28 gauge is now quoted at $9 and No. 26 gauge at $10, with the range as high as $9.20 on the former. There is a better inquiry for corrugated sheets.

TORONTO—	Galvanized Per 100 Sq. Feet	Painted
No. 28 gauge	$ 9.00-$9.20	$ 7.50
No. 26 gauge	10.00-	....

Stock Of Boiler Tubes Continues To Dwindle

BOILER TUBES.—The stock of boiler tubes continues to dwindle in view of the restriction on imports and the tight rein held over the situation by the Canadian Government. Only those tubes can be sold for domestic consumption on which a permit is secured from the Government. This stand has been taken in order to conserve stocks, as the United States Government will only let supplies go out of the country which it can be shown are purely to further the military activities of the Allies. Prices in the local market held unchanged.

Toronto—	Per 100 feet Cold drawn	Lapweld
1 inch	$36 00	$ ....
1¼ inch	40 00	....
1½ inch	43 00	36 00
1¾ inch	43 00	36 00
2 inch	50 00	36 00
2¼ inch	53 00	38 50
2½ inch	55 00	42 00
3 inch	64 00	50 00
3¼ inch	....	58 00
3½ inch	77 00	60 00
4 inch	90 00	75 00

Market For Old Materials Reported Dull

OLD MATERIALS.—There is a dullness in the market for old materials as a result of the lack of interest on the part of consuming mills. Wholesalers are accordingly not anxious to take on much new business, although there is buying when conditions of purchase seem to indicate a reasonable chance of gain. Quotations held unchanged from those of last week.

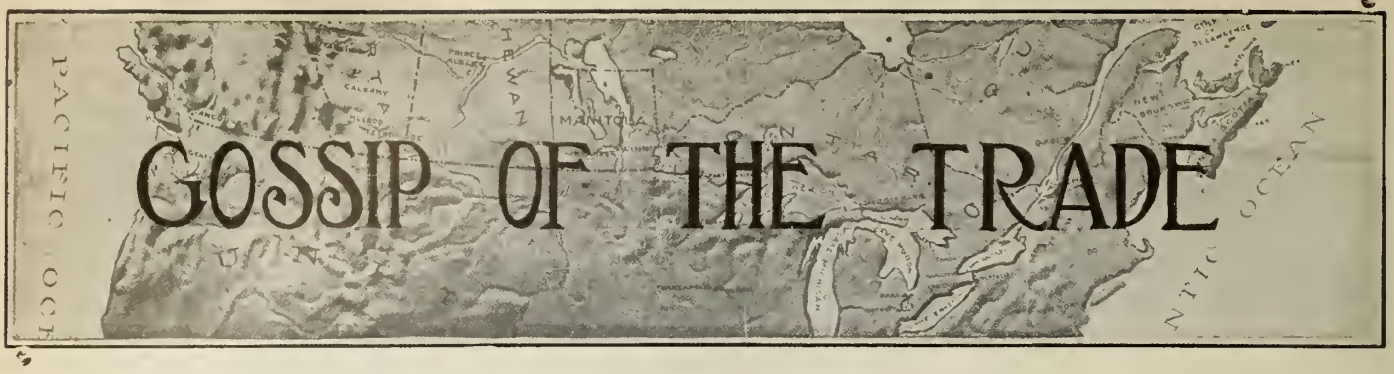
Tea lead	$ 0 04	....
Heavy lead pipe	0 05½	....
Yellow brass	0 12	0 13
Red brass	0 20	....
Light brass	0 09	....
Heavy zinc	0 05½	0 06
Heavy copper	0 20	0 21
Stove plate, per ton	17 00	18 00

Tin Situation Shows No Improvement

INGOT METALS.—Tin continues to be the item of great interest in the ingot metal market. There is no relief in sight as yet so far as getting additional stocks for this continent are concerned. Other metals held steady during the week, both in primary and local markets.

COPPER.—The copper situation holds pretty much in the status prevailing for several weeks past. In the primary market in the United States the Government has established the price for its purchases at 23.50c per pound, and has intimated that purchases for the domestic consumers should not be made above that figure until some decision is

(Continued on page 27.)



HOME ON FURLOUGH

Enlisting some two years ago, making good and taking up actual flying six or seven months afterward, Fred C. Armstrong has been granted a well-earned rest, and is at present spending a few weeks at home in Toronto with his parents.

During his 17 months' activity as Flight Lieutenant in the Royal Naval Flying Corps, he has won the title of Flight Commander, the D.S.C. and the Decor De Guerre.

From the above it will be seen that in Flight Commander Armstrong the country has a man who will leave this world better for having lived in it. Just a boy of twenty, now after two years he is a man, and a man who has seen war in all its horrors, a man who as a boy heard the country's call and did not have to be told his duty.

He has been flying for the last 17 months in France, between Belfort and Dunkirk, and will be leaving home for the front during the early part of December.

We wish him God-speed and a safe return for more reasons than one. First, because Canada cannot afford to lose such men, and because men who can "do things" in war can certainly be depended upon to accomplish greater things in times of peace.



Flight Commander Fred C. Armstrong, Home on a month's furlough.

Toronto D. S. & H. E. Monthly Meeting

New Members Enrolled and Applications Received From Others—Buffalo Trip Postponed—Nomination of Officers.

President Fred H. Gentle presided. John H. Gowan was initiated a member. Applications for membership from Chas. C. Ormsby and Harry A. Weinraub, of the Acme Plumbing and Heating Co., were passed upon as favorable. The secretary reported that two boxes—one of comforts and another of toilet articles—had been forwarded to the six members overseas.

Buffalo Trip Postponed

The proposed trip to Buffalo of a party of our members on Thursday, November 22nd, was cancelled on the request of the Buffalo Master Plumbers' Association, due to an accident to their president, Wm. Dechert. Mr. Dechert was run down by a motor truck and received a fracture of the skull. From last reports he was progressing satisfactorily, and they expected to remove him to his home from the hospital on November 26 or 27. Expression of regret and the hope for a speedy recovery of Mr. Dechert from the effects of his accident were passed by the members.

The suggested date of December 13th, as received from the Buffalo Masters for the deferred visit, was decided against by the members, and it was proposed that the visit be held over until the new year.

A letter of condolence was approved of to be forwarded to Mr. John T. Aggett, he having lost his son, Lieut. Harvey Aggett, in action somewhere in France.

Successful reports were received from the Ender Clubs in the progress they are making, especially the North and West Ender Clubs. The East Enders' Club has arranged to hold another meeting on Thursday, November 29th, in Room No. 503, 22 College Street.

Chairman John Wright, of the sanitary committee, demonstrated to the members the new style of water key box and key for same, as adopted by the Department of Works for water services.

Secretary Frankland gave a further talk, this being the second of a series on "Overhead Expense and Profits in the Plumbing and Heating Trade."

Officers Nominated

The nominations for officers and chairmen of committees for 1918 resulted as follows, all positions being open until next meeting for further nominations excepting treasurer and secretary, which were made made unanimously for the present incumbents:

President—Fred H. Gentle, Thomas H. Ferguson, and A. S. Purdy.

Vice-President—Thomas H. Ferguson, Fred. A. Wiles, and George H. Cooper.

Treasurer—Thomas M. Maxwell, acclamation.

Secretary—Garrett F. Frankland, acclamation.

Warden—George H. Cooper, A. F. Passmore, George C. Abbott, Wm. Geo. Cameron, and Wm. J. Hall.

Tyler—A. F. Passmore, Norman Swanston, Charles Locke, and Harold J. Hillier.

Auditors—W. R. Harry Daniels and Albert H. Read, acclamation.

Trustees—A. S. Purdy, T. B. Smyth, George McGuire, Frank R. Maxwell, George Clapperton, and Harry G. Waterman, acclamation.

Nominated for Executive Committee (Nine to be Elected).

A. S. Purdy, Harry Farthing, Robert J. Shannon, Wilfred E. Ramsey, Thomas B. Smyth, George Clapperton, John Wright, Harry G. Waterman, Fred A. Wiles, Fred H. Gentle, Thomas H. Ferguson, George C. Abbott; Kenneth B. Allison, George McGuire, Frank R. Maxwell, E. Lewis LeGrow, Charles Chapman, Wm. J. Hall, Norman Swanston, and George H. Cooper.

Elections to take place on the next regular meeting night, Wednesday, Dec. 19th, 1917.

A FEW WORDS FROM ONE OF THE BOYS

Toronto members of the craft will be pleased to know that they are still remembered in memory pictures of home by Sergeant H. Ruddick, First Canadian Division, Machine Gun Company. But Harry has other pictures imprinted in his mind—pictures of horror painted in life story by Kaiser William; pictures where men die, yet really live; pictures which to one side depict success, to the other, pain, death, and destruction all in one.

Sergeant Ruddick has had some very narrow escapes, as related to the writer by his wife, who has just returned from England after spending ten days with her husband.

One day he and a company of some 50 comrades were scattered by a shell coming their way. Out of the 50, one was wounded, 48 killed, and only our friend Harry came out without a scratch.

Another time a number of them were in a rest camp behind the lines, a distance of two miles. The weather was hot and the party changed their position to a more shady one. Not 60 seconds after the place they previously occupied was a mass of ruins. In some way or other the enemy made a "lucky shot," but no one was hurt.

These and many others are just everyday incidents at the front.

Sergeant Ruddick has been in the firing line nearly two years, and would thoroughly appreciate a rest, but he declares he is not by any means sick of the fight while there's any fighting to be done.

Mrs. H. Ruddick is now residing at 35 Muir Avenue, and will be pleased to hear from time to time from some of the friends and acquaintances of our old comrade, Sergeant H. Ruddick.

MARKET CONDITIONS AND TENDENCIES

(Continued from page 25.)

reached at Washington. This has placed the trade so far as obtaining supplies for domestic manufacture are concerned pretty much at a deadlock. In the local market quotations for casting copper was higher by ½c per pound in certain quarters, the price ranging from 32c to 32½c. Electrolytic was also quoted at 32½c.

TIN.—The British Government has not yet released supplies of tin being held therefor shipment to Canada and the United States, and the situation on this continent continues to be one of dwindling stocks, with high and firm prices prevailing on account of the scarcity. Intimation is made that some arrangement may be made with the British Government looking to the granting of license to ship. Prices ranged higher in the local market from 72c to 78c per pound.

SPELTER.—Curtailment of output of spelter is under way in the United States, as advices were received during the first part of the week that the largest smelting plant in the United States has curtailed operations to the extent of two-thirds of its capacity. The market is in a quiet condition. Should curtailment of production continue, the market sooner or later is bound to take on a firm tone. Locally quotations held at 10c per pound.

LEAD.—A quiet tone prevails in the market for lead. There were freer offerings in the primary market for both prompt and future delivery, but prices held steady in that quarter during the week. Locally quotations were unchanged at 9c per pound.

ANTIMONY.—There is dullness in the market for antimony, and prices held unchanged at 16c to 18c per pound in the local market.

ALUMINUM. — Quotations held unchanged at 60c per pound in the local market. There is very little ingot aluminum obtainable for domestic use, as the Government is keeping strict surveillance over importations to the end that sufficient supplies of sheets may be obtainable for aeroplane manufacture.

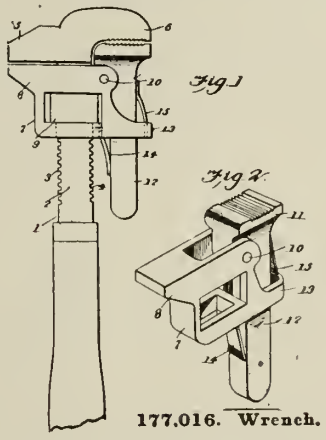
PIG IRON.—Some supplies of Hamilton pig iron will soon be obtainable, as the smelters there have recently taken one of their steel smelting furnaces for use in smelting pig iron. Price of pig iron holds at the recent decline, $50 now being asked for foundry iron. The coke situation is becoming more serious on account of the congestion on the rail ways.

New Canadian Patents

NO. 177,016.

Percy A. Martin, Columbia, Missouri, U. S.A., 15th May, 1917; 6 years. Filed 22nd February, 1917. Receipt No. 276,089.

Claim.—1. In a wrench, a shank having a lateral head, one of the working faces of which being disposed forward of the other, a carriage including a head arranged for slidable movement upon a shank, the said head adapted to co-act with one of the heads of the shank, said carriage having one of its ends formed with a yoke, an elongated member having one of its ends formed with a head, which is adapted to co-act with the second head of the shank, passing through the yoke of the carriage and pivotally connected with the carriage opposite the



177,016. Wrench.

said yoke, a spring carried by the connecting member of the yoke and bearing upon one of the edges of the said elongated member, a second spring secured to the carriage and bearing upon the opposite edge of said member and the bearing of the ends of the spring being arranged in opposite directions with relation to each other.

2. In a wrench, the combination with the threaded shank having the laterally extending jaws which have their working faces parallel but not in a line with each other, of the carriage slidable upon the shank and having the lateral jaw which co-acts with one of the jaws of the shank and also having the lateral opening for the turning nut which co-acts with the threads of the shank, and the yoke extending laterally from the carriage diagonally opposite the end provided with the jaw, the headed member provided with the handle received in the yoke and pivoted to the carriage opposite the jaw thereof, and the springs secured to the yoke and bearing in opposite directions upon the opposite edges of the handle.

3. In combination with a stationary jaw having a centrally arranged angularly disposed toothed shank, of the herein described construction of movable members for the jaw of the said shank, comprising a frame, including a movable jaw having spaced arms extending longitudinally therefrom, an angular member arranged outwardly of the said arms and connected with the jaw, arms formed on the end of said angular member and extending longitudinally therefrom in a didection parallel to the plane of the first-mentioned arms, said last-mentioned arms being of a greater length than the first-mentioned arms and having their ends connected, a connecting member between the ends of the first-mentioned and the second mentioned arms, a transverse plate connecting the second-mentioned arms at the juncture of the connecting members between the first and second-mentioned arms, the toothed shank of the stationary jaw being disposed in the spaces between the first-mentioned and second-mentioned arms, an operating nut upon the threaded shank and having its opposite sides projecting through the openings in the sides of the frame, an auxiliary jaw including a shank pivotally connected to the ends of the first-mentioned arms, and spring elements secured to the outer and inner connecting members of the second-men-

(Continued on page 30.)



Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

WHAT IS WRONG WITH THIS JOB

It has come to our notice that pneumatic water systems are very often connected to existing water supply systems, as shown in the accompanying drawing (Fig. 1).

In the first place a well has been dug, a force and lift pump has been fitted to the well, and has given as good a service as could be expected from such an outfit. The pump worked splendidly and from the day it was installed not one minute's trouble has resulted.

But the owner has had a bathroom installed and other sanitary appliances, including a pneumatic water supply system, and the latter simply will not deliver water to the tank. The sanitary engineer as well as the owner are at a loss to know the cause of the trouble. Another apparently peculiar condition is that the lawn pump still works as well as ever except that possibly a few more strokes are necessary before water reaches the spout.

The Trouble

In the first place those who have such systems to instal should always bear in mind that a pump, no matter what kind, must first expel all air out of the suction pipe line before any water can be procured. Next, the suction pipe must be absolutely tight from at least the water line in the well to the pump, and if the pump is of a reliable make and the water has, say, 20 to 25 feet of a lift from the cylinder in the pump to the water in the well, water will positively be pumped up that distance.

But here is a case where an ordinary force and lift pump is connected to the suction line of the pneumatic water system. The fact that the latter was installed after the force and lift pump does not alter the present state of affairs. As it now stands the force and lift pump is on the main suction line. The pump on the pneumatic water system is, of course, more powerful and is drawing air through the other pump. It will certainly do so before it will lift water from a lower level. It cannot be expected that the valves in the force and lift pumps will be so tight as to prevent air being drawn through them. Cases have been known in which a reliable vertical check, or even foot, valve have been placed just at the branch of the tee and the trouble somewhat overcome in that way. But the best and most reliable method is to run a separate suction line for each pump. There can then be no trouble whatever.

(Continued on page 30.)

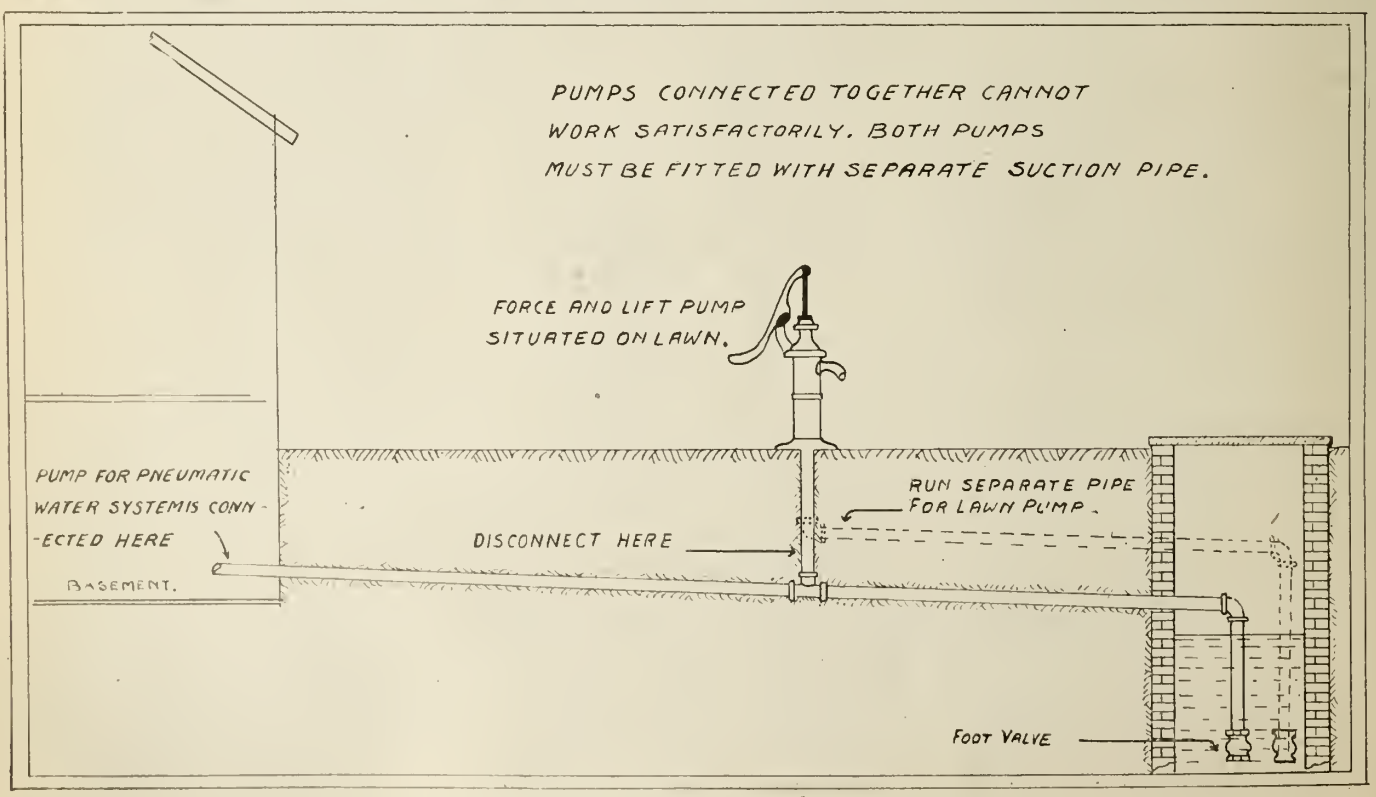


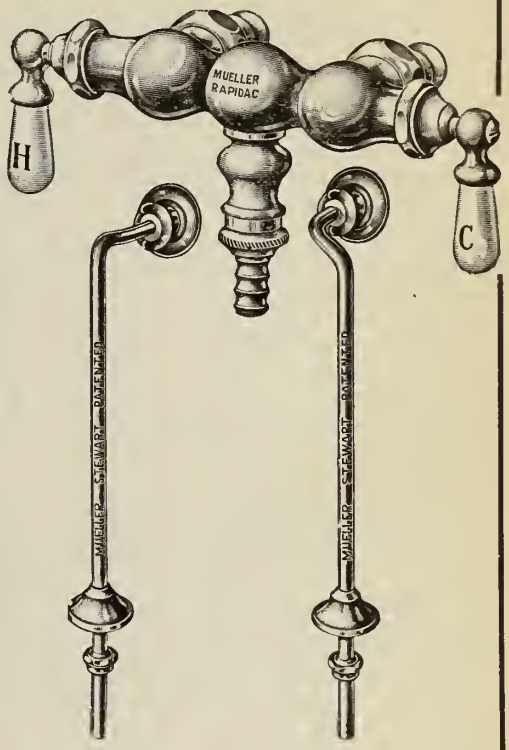
FIG. 1.

Quality makes the most Sales

In nine cases out of ten it's quality that closes the sale of plumbing fixtures. You discuss price, and terms, and how long it's going to take to complete the installation—but finally you come back to quality. It's what you are able to tell of the quality of your goods that holds the interest of your prospect and finally leads him to buy.

When you "talk quality" on a "Mueller Rapidac" Fixture you have a perfectly made, beautifully finished object that compels belief in the truth of your claims. Your prospect can see for himself that unusual care has been taken in its manufacture, consequently he will the more readily believe what you say about the things he can't see.

And then, when the sale is made, and the installation completed, there's a fixture that for years speaks volumes for your business integrity and ability.



Fuller in Design
Compression in Action

It's a

MUELLER
Rapidac

H. Mueller Mfg. Company, Limited

SARNIA :: :: ONTARIO

Makers of High-Grade Water, Plumbing and Gas Brass Goods and Jobbers of General Plumbing Supplies

When writing advertisers please mention that you saw their advertisement in the SANITARY ENGINEER.

THE QUESTION BOX

(Continued from page 28.)

Dotted lines from the vertical part of the suction pipe to the well show the simplest way of overcoming the trouble. It may be that such an undertaking at this time of the year would be inconvenient. Then we would suggest that the pumps on the lawn be disconnected until the winter is over and a cap screwed on and made perfectly air tight, then no doubt the pneumatic water system will work O.K.—Editor.

STEAM AND RADIATION

Each square foot of direct radiation surface gives off about 2 heat units an hour for each square foot and for each degree difference in temperature between the steam pipe and the air in the room. If the temperature of steam is 212 degrees, temperature of air 70 degrees, and the latent heat of steam 966 heat units, each square foot of heating will condense $2 \times (212 - 70) = 284$ heat units, and $284 \div 966 = .2942$ of a pound of water, or from ¼ to 1/3 of a pound, either one is close enough for all practical purposes. Between 4 and 4½ square feet of radiating surface is provided for each pound of steam to be condensed.

For instance, a factory building requires 10,000 square feet of radiation. It is required to know how many pounds of steam will have to be furnished to heat the building, and how many pounds of coal an hour it represents. Dividing 10,000 by 4 gives 2,500 pounds of steam, and if one pound of coal will evaporate 8 pounds of water, the weight of coal required is $2{,}500 \div 8 = 312$ pounds an hour. This would require the exhaust from an engine of about 80 horsepower.—"Southern Engineer."

NEW CANADIAN PATENTS

(Continued from page 27.)

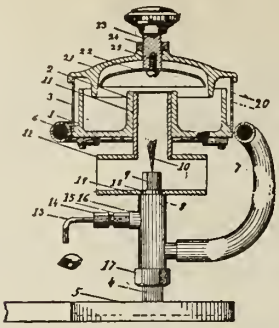
tioned arms and extending in opposite directions therefrom and contacting with the opposite edges of the shank of the auxiliary jaw.

No. 177,768.

William Cooke, Shelton, assignee of Richard A. Uhlin, Seattle, both in Washington, U.S.A., 19th June, 1917; 6 years. Filed 10th April, 1917. Receipt No. 278,125.

Claim.—1. In a regulator for oil burners, a mixing chamber comprising a floor, an intake tube rising in the center thereof, a perforated outer wall at the outer edge of the floor, an inner wall rising from the floor near the outer wall, an internally concave cap fitting closely upon the said outer wall and having a ring portion depending between the inner wall and the intake tube, a regulator concave in the under side and loosely fitting the inner face of the cap, and a connection passing up through the cap for adjusting the regulator.

2. In a regulator for oil burners, a mixing chamber comprising a floor, a perforated outer wall, an inner wall and an intake tube rising from the floor, an internally concave cap resting upon the outer wall, an internally concave regulator loosely fitting the interior of the cap, and a screw suspending the regulator from the said cap.



No. 177,768. Oil Burner.

Wanted, Second-Hand Machines

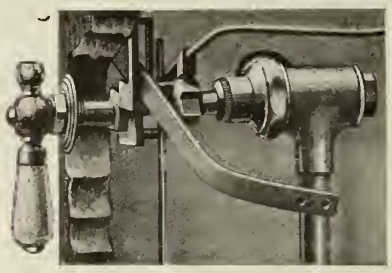
One Pipe Threading Machine, capacity 1 inch to 6 inch inclusive.

One Pipe Threading Machine, capacity 2½-in. to 8-in. inclusive.

One Double Head Nipple Machine, ½-in. to 2-in.

Must be in good working condition. Williams' type of Threading Machine; Hall or Murchey Nipple Machine preferred.

Box 50, Sanitary Engineer, Toronto



TRADE **Silentfill** MARK

Water Closet Combinations Without Ballcocks— No Noise

MANUFACTURED BY

CALLOW & PHILLIPS

40-42 Lombard St., Toronto, Can.

Telephone Main 2016

3 BIG REASONS WHY YOU NEED

PURO

(MADE IN CANADA)

1. Puro Sanitary Drinking Fountains will give you a *better* water supply *cheaper.*
2. Puro will cut your water bills 15% to 35%.
3. PURO will safeguard the health of your employes and raise the standard of efficiency.

Are not these reasons enough? Then why hesitate longer?

PURO equipment is not expensive—the first cost is *low* and the up-keep *nothing.* Easily attached; positively fool-proof. Let us make you a special proposition for a try-out in one of your departments. Write us now—to-day—giving us the number of men; an inquiry will cost you nothing.

"PURO-FY"

YOUR WATER SUPPLY

Puro Sanitary Drinking Fountain Company

143 University Ave.

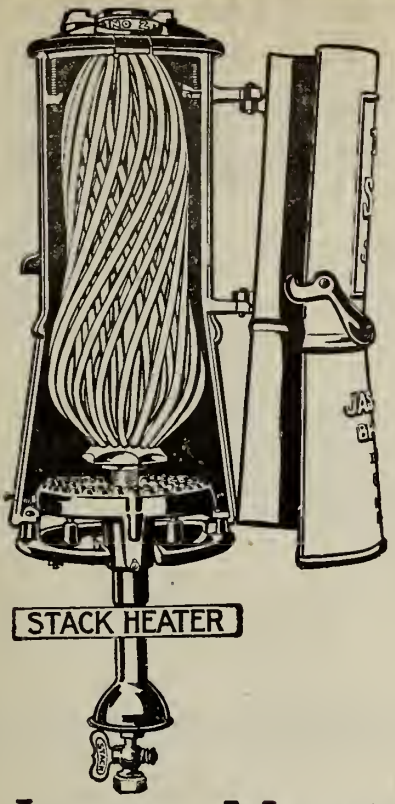
TORONTO, CANADA



WANTED—A PRACTICAL PLUMBING AND heating salesman to travel in Alberta. References required. Write, giving age and experience. Address Box 800, Sanitary Engineer.

Two yokels were discussing the probabilities of the Germans invading England. The older of the two was most emphatic in his contention that the Germans would never get there. "And if they do," he went on, "where be they going to fight? Gaffer wouldn't let 'em come on 'is meadow, and I be main certain t' old squire wouldn't lend 'em his park."

Stratford, Ont.—By-law has been passed by the City Council providing $15,000 for water works extensions.



STACK FACTS

From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

The STACK will heat 3 gallons more in 10 minutes than the average heater.

The STACK shows 15% greater efficiency than the average heater.

James Morrison Brass Mfg. Co., Limited

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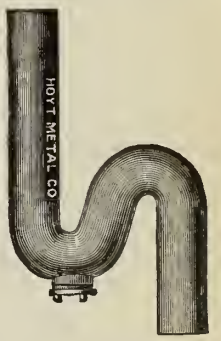
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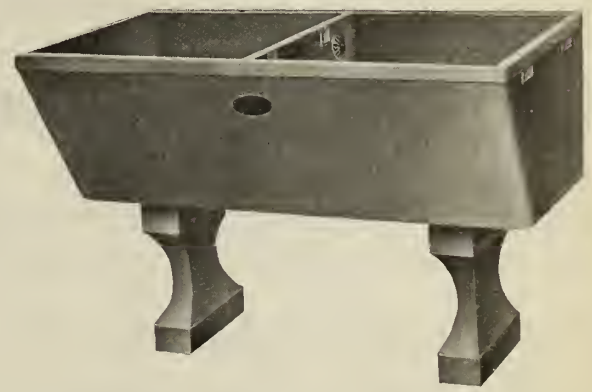
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--Leacock, of Course

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THIS contribution, by Col. John Bayne Maclean, goes backward many years—to the time of the South African War in 1899-1900. That was when Canada first took up arms for the Empire. Politics, of a high order, was back of the decision to send Canadian troops to the Antipodes. It is "inside" history.

Oppenheim—Allenson—McBeth—Mumford

A LONG instalment of Oppenheim's absorbing story, The Pawns Count, is given in the December MACLEAN'S. A short story, by A. C. Allenson is seasonable. Madge McBeth contributes a complete novelette, The Man Who Wasn't. And Ethel Watts Mumford, teller of delightful tales, delicately told, gives us the first of a series of short stories—Love and the Locksmith.

The Usual Popular Departments

THE Business Outlook, The Nation's Business, Women and Their Work, and the Review of Reviews—all are present in strong way in the December MACLEAN'S.

At All News-Stands 15c.

Gadsby's Story of the Union Government

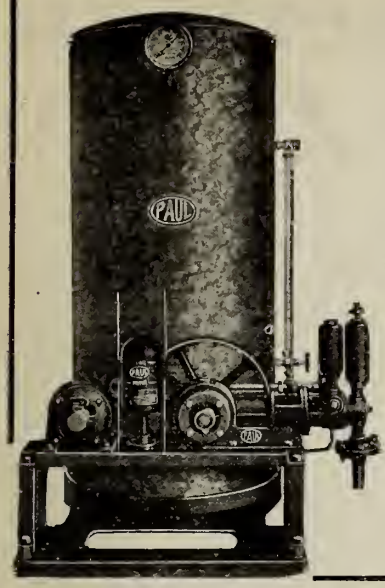
GADSBY is saturated with Ottawa knowledge—much of it of the inside variety. He pokes about, talks with big men; and big men, and lesser ones, talk with Gadsby. Useful sort of man, is Gadsby. What he hears and learns he writes about for MACLEAN'S; and in this story of his about the new Union Government, he reveals the undercurrents on the movement that developed into negotiations, and which finally resulted in a Union Government. Gadsby adds interesting biographical information to his brilliant study.

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F. E. MUTTON,
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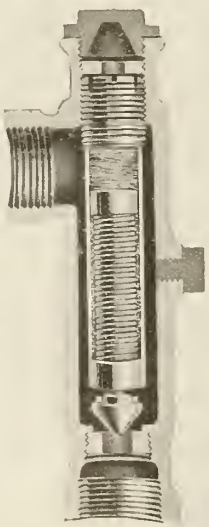
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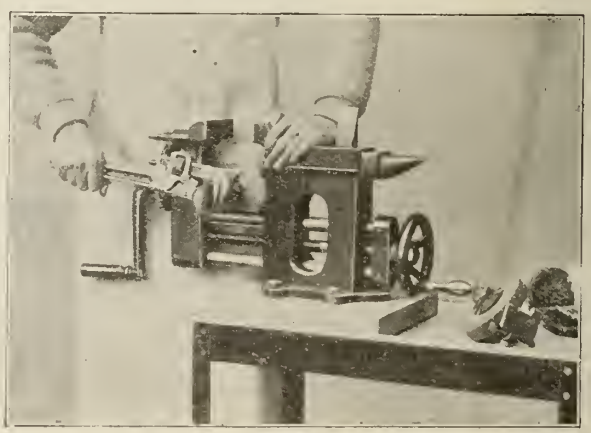
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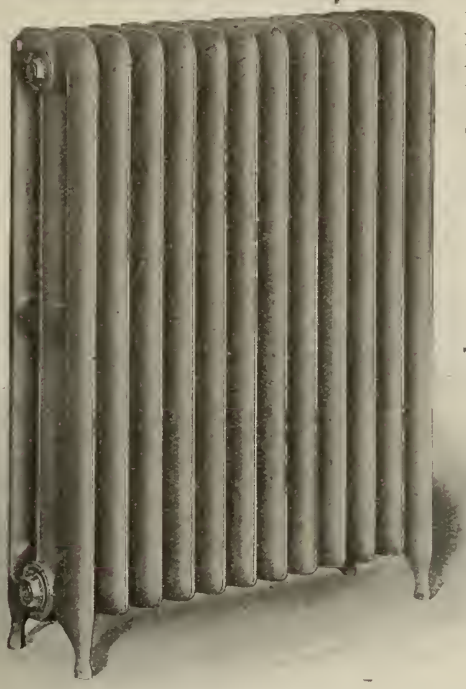
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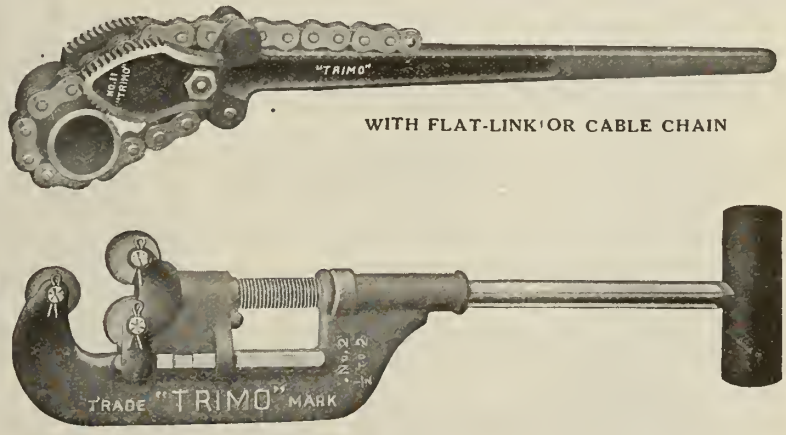
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TORONTO

World-Famed Specimens of the Age of Steel

TRIMO



TOOLS

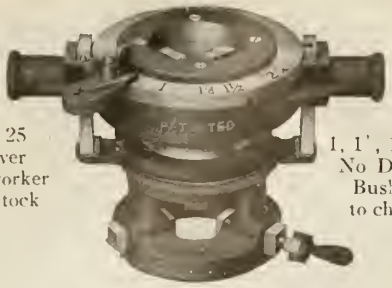
WITH FLAT-LINK OR CABLE CHAIN

Send for Catalog No. 91

MADE BY

TRIMONT MFG. CO., 55 Amory St., Roxbury, Mass., U.S.A.

Kindly mention this paper when writing Advertiser.



No. 25 Beaver easy-worker Die Stock

1, 1', 1½, & 2 No Dies or Bushings to change

MANUFACTURED BY

You Don't Pay for "Beavers"—

THEY PAY FOR THEMSELVES

Figure it out for yourself! Thousands of Beavers have been in constant use for nearly 10 years—and are still good.

The cost works out at about ½ cent a day for the tool shown in this advertisement.

Call up your jobber now—and order a "Beaver" or at least write for booklet D-12.

THE BORDEN-CANADIAN COMPANY

TORONTO, CANADA

Why Not Increase Your Income

No matter what your present salary may be—you would like to add to your present income, wouldn't you? Providing, of course, the plan interferes in no way with your regular occupation and paid you liberally.

We have a plan—a money-making one for you. It takes no time from your regular duties, devote an hour or so to it every day and you will augment your present income by $5.00 or $10.00 a week. The exact amount all *depends* on the amount of time you can spare us. Hundreds of our district representatives have found the plan so profitable they have given all their time to it. Would a plan such as this interest you? If so, write us to-day. Say, "Send me full particulars of your money-making plan, I am interested."

The MacLean Publishing Co.

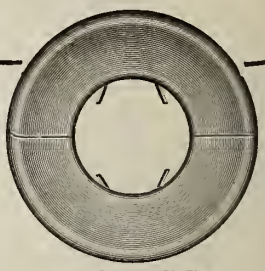
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TORONTO, ONT.



OPEN VIEW NO. 10-A.

The CEILING PLATE that's better



TOP VIEW NO. 10-A.

THE NO. 10—A NARROW FLANGE PLATE IS A STEEL HINGED PLATE. FLANGES ¾" WIDE. HIGHLY FINISHED. ESPECIALLY DESIGNED FOR TWIN CONNECTION "NARROW."



Gem No. 4.

The split ceiling plate is coming more and more into use than ever and ALWAYS GIVES A NICE FINISH, because it can be attached to mains and risers at the very last, and is not exposed during completion of a building on the floors.

High quality at the right price.

Gem No. 4 Automatic Air Valve

Made from the best brass obtainable. Pressed shell and pressed brass base which eliminate danger from blowholes, which is a fault with cast bases.

Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

THE TINSMITH'S HELPER AND PATTERN BOOK

By H. K. Vosburgh **Revised by William Neubecker**

This is a book of 135 pages, 54 plates. Epitome of mensuration. Mensuration of surfaces. Tables, Rules and Recipes. Practical Receipts, on the making of all kinds of solder.

The Most Practical "Helper" Ever Introduced Into The Tinshop.

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BIG TIME AND LABOR SAVERS

By the use of Figure 1 you save two threads, do neater work and make sure that the connection is trouble-proof.

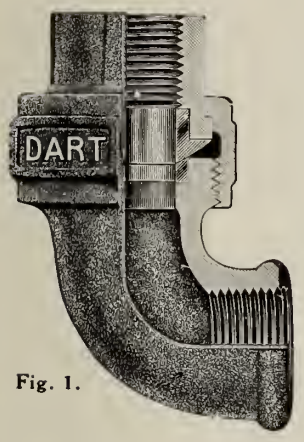


Fig. 1.

Dart Union Elbows

(Female, and Male and Female)

Dart Union Pipe Couplings

Tight—Permanently

Both Faces of the Joint are Bronze; there is no deterioration. The iron parts are extra heavy; they cannot stretch or pull apart.

Another advantage of using Dart Unions is that they are easily and quickly connected, whether pipes are in or out of line.

SOLD BY ALL FIRST-CLASS SUPPLY HOUSES

Absolutely guaranteed.

Manufactured and Guranteed by
DART UNION COMPANY, Limited
TORONTO, CANADA

Figure 2 is a 4-in-1 fitting. It cuts out nipple and one thread at running end and nipple, elbow and two threads at the elbow end.

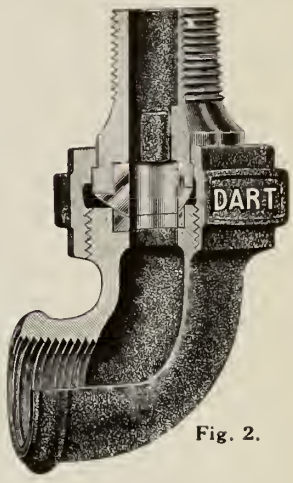


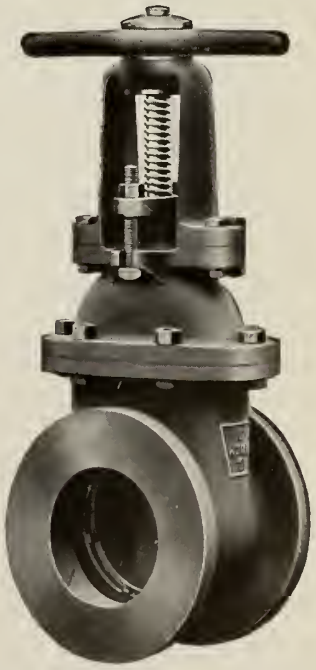
Fig. 2.

There Are Lots of Gate Valves



advertised and sold, but not all of them possess that neat appearance, combined with strength and stability, which characterizes

KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

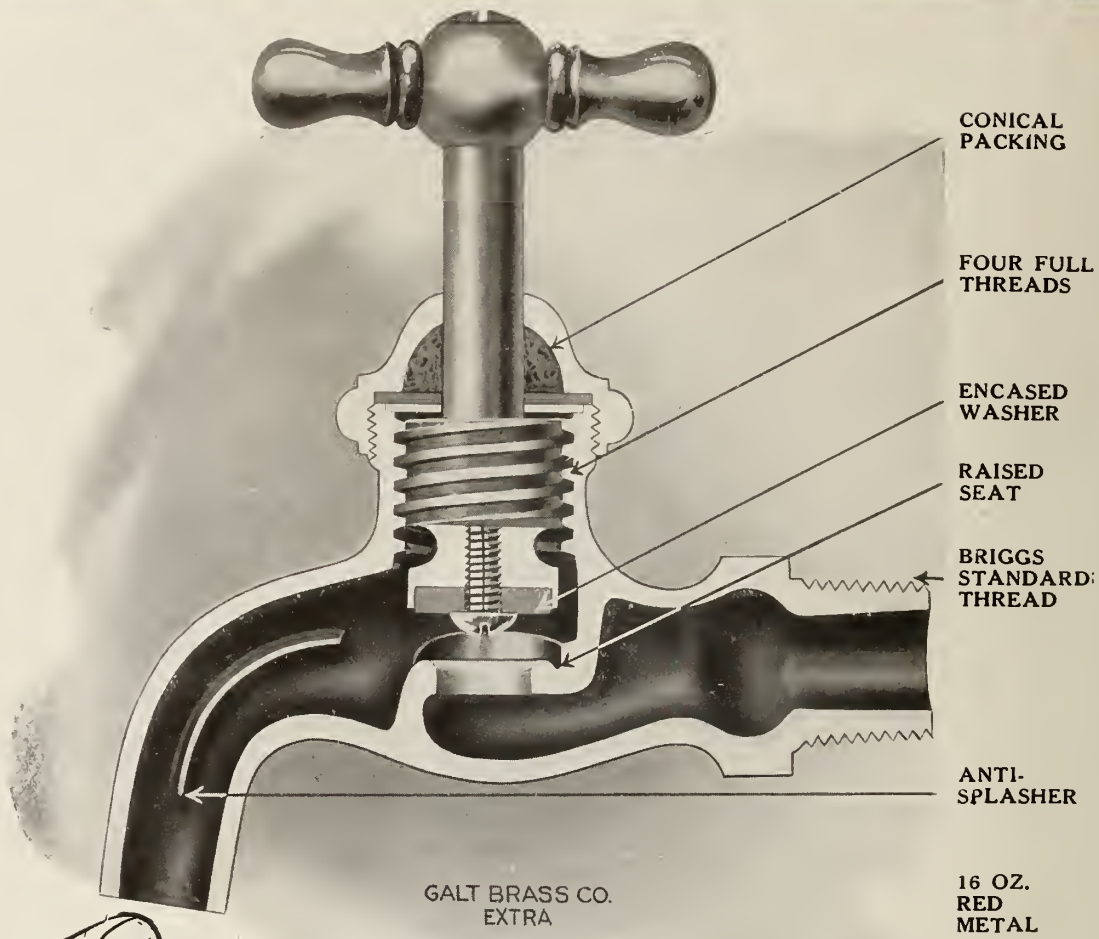
Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

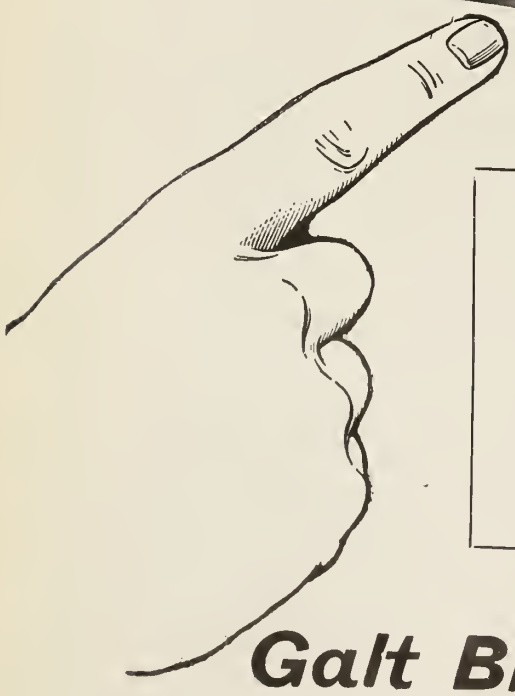
Approved by the Fire Underwriters Association, and Registered by Boiler Inspection Departments of Ontario, Saskatchewan and Alberta.

THE KERR ENGINE COMPANY, LIMITED - Walkerville, Ontario

Registered **PERFECTO** *Trade Mark*

You Can Install This Line and Establish Confidence of Your Customers





GUARANTEE

Any article of our make proving defective through inferior metal, or improper workmanship, on our part, will be replaced with TWO good ones, at NO CHARGE to you.

CAN YOU BEAT IT?

SEND US YOUR ORDER NOW

Galt Brass Company, Limited

Galt, Canada

CHRISTMAS GREETING NUMBER

SANITARY ENGINEER

PLUMBER & STEAM FITTER of CANADA

THE MACLEAN PUBLISHING COMPANY, LIMITED, PUBLISHERS

Vol. XI | Publication Office: TORONTO, DECEMBER 15, 1917 | No. 24

FILE COPY

Greeting

THE BEST we can Wish You This War-Time Christmas is that, despite conditions, the Past Year has been so good to You that you are encouraged to face the Coming Year with Enthusiasm and Confidence.

We Thank You for Your Business of the Past Year.

Empire Manufacturing Co., Limited

LONDON
TORONTO

FILE COPY

A Beaver Brand Pedestal
is a Lavatory Fixture Worth While



A HIGH-GRADE LAVATORY THAT CANNOT BE SURPASSED

A bathroom which is fitted with Beaver Brand cast iron enamel ware bears the stamp of quality and lasting service, and a pedestal lavatory puts such a bathroom in a class by itself.

Ask your jobber for BEAVER BRAND CAST IRON ENAMEL WARE

Amherst Foundry Co., Limited

General Offices and Factory: Amherst, Nova Scotia

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Monarch Brass Mfg. Co., 71 Brown St., Toronto

MANITOBA and NORTHWEST:
E. B. Plewes, 120 Lombard St., Winnipeg

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION
RUBBER SYSTEM
AND ASSOCIATED COMPANIES

We sincerely thank the friends and fellow-workers of the Dominion Rubber System for their good-will and hearty co-operation during Nineteen-Seventeen, and extend to one and all the

COMPLIMENTS OF THE SEASON

and our best wishes for a

HAPPY, PROSPEROUS NEW YEAR

Canadian Consolidated Rubber Co. Limited

Head Office - - MONTREAL

Service Branches at Halifax, St. John, Quebec, Ottawa, Toronto, Hamilton, Brantford, Kitchener, London, North Bay, Fort William, Winnipeg, Brandon, Regina, Saskatoon, Calgary, Lethbridge, Edmonton, Vancouver, Victoria.

The Largest Manufacturers of Rubber Goods in the British Empire.

WHEN YOU NEED IT

Type "K" Brass Gate Valves

will give you the service you need at all times and under the most trying conditions.

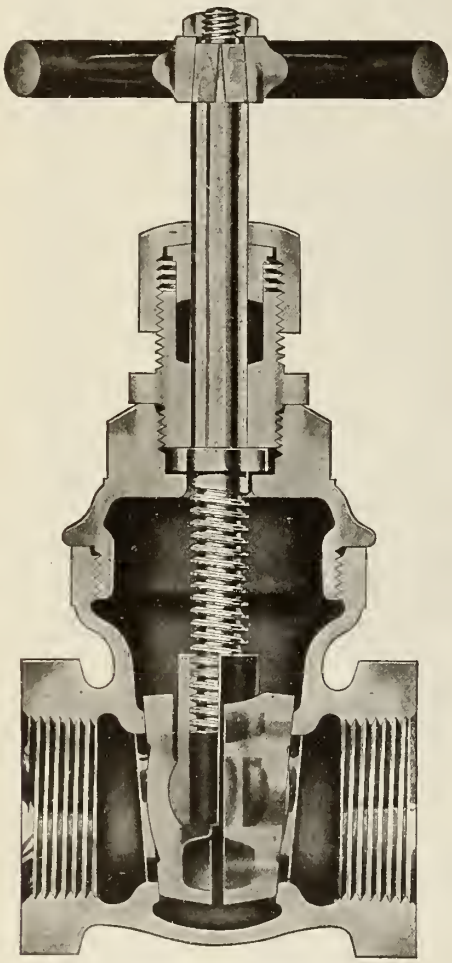


Fig. 300 SECTIONAL VIEW

They have a reputation for reliability, long life and sustained efficiency. In competition with other makes they are admittedly the

STANDARD OF COMPARISON

This indicates *superiority.*

Catalogue No. 8 free on request

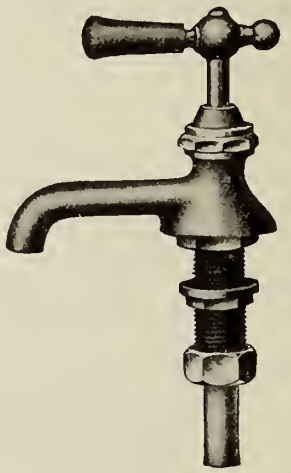
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103 St. Remi St. - Montreal

Joseph Breeden & Co., Ltd.

NEW MILL WORKS

Fazeley Street, Birmingham, England



MANUFACTURERS OF

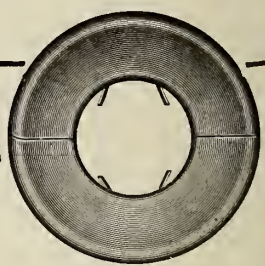
HIGH CLASS

Steam and Water Fittings



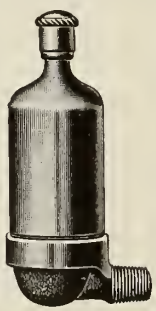
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High quality at the right price.

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Write for catalog showing our complete line of specialties.

The BEATON & CADWELL MANUFACTURING Co.

New Britain, Conn.

Eastern Agent: J. R. Devereux & Co., 233 St. James Street, Montreal. Western Agent: A. E. Hinds & Co., Chamber of Commerce, Winnipeg.

"Standard"
"Perfection" Built-In Baths

Made in One Piece Enamelled All Over



These Baths represent the last word in design and finish, and are made to build into Right or Left Hand Corner or into a Recess.

The "Perfection" Built-in Bath is only 17½ inches high, therefore convenient. It builds into walls and floors, the absence of all dust-collecting cracks and corners, meaning bathroom sanitation.

Made in 5 and 5½ foot sizes.

Illustrations on request.

Write the nearest dealer.

Standard Sanitary Mfg. Co.
Limited

General Office and Factory, Royce and Lansdowne Aves., Toronto, Ontario

Toronto Store:
55-59 Richmond Street East

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76 Lombard Street

Hamilton Store:
20-28 Jackson Street West

Montreal:
4 Beaver Hall Square

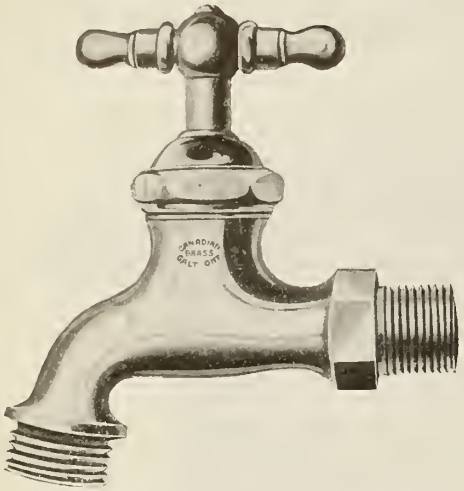
Calgary:
31 Canada Life Building

Vancouver:
847 Beatty Street

"MADE IN CANADA"

A Merry Christmas

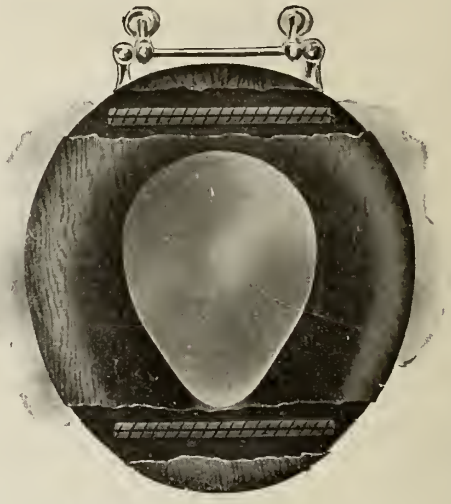
We wish to express our appreciation to our customers, and thank them for the business they have given us during 1917, and also in anticipation of an increased volume during 1918



"Canadian"
Brass Goods

TRADE B.O.T. MARK

Water Closets
Unconditionally
Guaranteed



The Canadian Brass Co., Ltd., Galt, Ont.

Toronto Office: B.O.T. Bldg., 159 Richmond Street W.



Pipe Threading Tools

Another problem that was solved by a "Toledo"

The upper end of this 6-inch pipe split. Ordinarily it would have been necessary to rig up a derrick, block and tackle and draw the entire length of pipe from the ground before repairs could be made. With a No. 3 "Toledo" Tool on the job the pipe was cut and threaded in position and the needed new section coupled on.

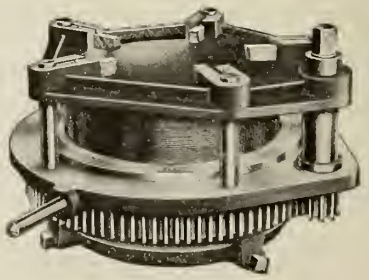
"Jardine" and "Toledo" Tools

are daily solving problems of all kinds. They work in any position and cut threads as clean and perfect as if turned on a lathe. They are portable, convenient, simple in construction, effective, economical.

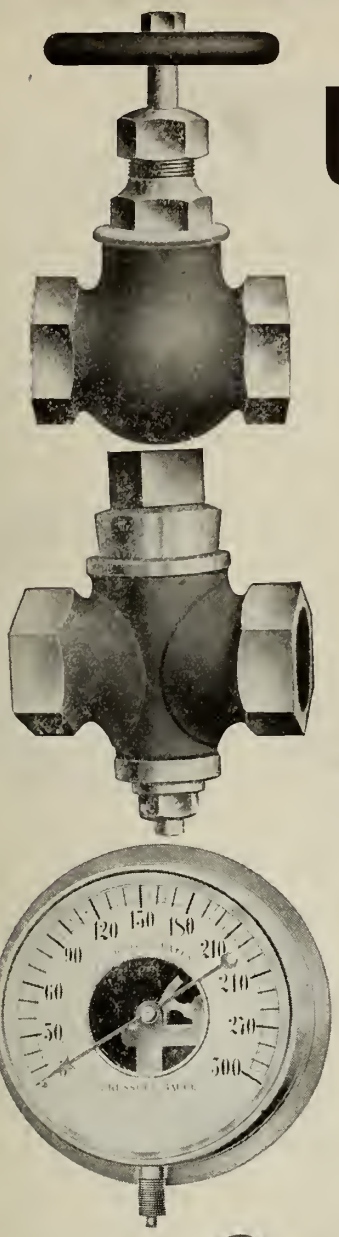
Ask us to tell you how you can without expense, prove to your own satisfaction that "Jardine" and "Toledo" Tools are all that we claim. Ask us to-day.

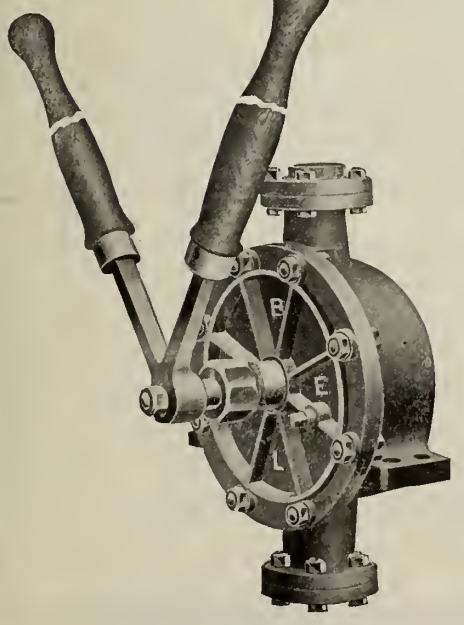
A. B. JARDINE & CO., LIMITED HESPELER ONTARIO

Sole makers of "Jardine" Pipe-Threading Tools.
Sole licensees to manufacture and sell Toledo Pipe-Threading Tools in Canada.
Agents, Winnipeg and West—Stanley Brock, Ltd., Winnipeg, Man.
Brockville and East—J. R. Devereux, 233 St. James St., Montreal.
Belleville and West—W. H. Cunningham, 98 Kingswood Road, Toronto, Ont.



"Toledo"
Geared Adjustable Threading
Tool No. 3





FIVE WORKS—OVER 3,000 EMPLOYEES

UNITED BRASSFOUNDERS and ENGINEERS, Limited

It is our intention after the War to devote our energies to the intensive production of the following Specialities:

Gunmetal and Brass Valves and Cocks.
Steam, Water and Compressed Air Fittings generally.
Cast Iron Stop and Sluice Valves.
Semi-Rotary Pumps.
Extruded Brass and Bronze Bars.
Brass Bolts and Nuts, Studs and General Turned Work from the Bar
Cast and Malleable Iron Cocks and Pipe Fittings.
Pressure and Vacuum Gauges.
Injectors, Engine Governors.
Spraying Machinery.
Coppersmiths' Work.
"Stella" Brand Alloys, Manganese Copper, Silicon Copper, Ferro Zinc, Phosphor Copper and Tin, etc.

Business After the War

If you are interested in any or all of the lines mentioned and are in a position to take a hand in the energetic distribution of the same, please communicate with us NOW to our Head Office.

EMPRESS FOUNDRY

Cornbrook, Manchester, England

SANITARY ENGINEER
PLUMBER AND STEAMFITTER OF CANADA

Vol. XI. TORONTO, DECEMBER 15, 1917 No. 24

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EDITORIALS.

Workers Wanted to Rebuild Halifax, N.S.—Have You Figured Right?—Cast Iron Versus Wrought for Soil, Waste and Drainage.

The MacLean Publishing Co., Limited

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SANITARY ENGINEER, PLUMBER and STEAMFITTER of CANADA

Edwin Newsome, *Editor*

R. L. Netherby, *Western Ontario Representative* Fred McLaughlin, *Eastern Ontario Representative*
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That you may have a Merry Christmas and a Happy and Prosperous New Year is the sincere wish of

Cluff Manufacturing Co.
LIMITED

1917-18



A lump of coal—a chimney—some radiators

PART of the heat from a lump of coal goes up the chimney. Part goes into the radiators.

The **question** is:

How small a part goes up the chimney—and **how big a part** goes into the radiators?

The **answer** is: That depends.

Depends, for one thing, on the length of the boiler's fire travel.

The longer the fire travel, the less heat goes up the chimney. **The more goes into the radiators.**

Which is the very reason why we put an **extra long fire travel** in the Burnham Boiler.

Three times back and forth on **both sides of the boiler** go the hot gases before they are allowed to escape to the chimney. Three times back and forth between waterways. **Heat-selfish** waterways, they are. So heat-selfish in fact, that all the time the hot gases are travelling back and forth, the waterways are **grabbing heat.** Until every available bit of heat is grabbed and **sent up into the radiators.** Only enough is left for the chimney to create the proper draft.

Tell your prospective boiler buyer about the Burnham's extra long fire travel. Explain to him how it makes an extra short coal bill.

Send for our Boiler Catalog.

Lord & Burnham Co., Limited

Boiler Department)

Royal Bank Building, Toronto

Burnham Cosy Comfort Heat BB

Of Canada

Factory: St. Catharines, Ont.

SANITARY ENGINEER

VOL. XI DECEMBER 15, 1917 No. 24

Some Profit-Making Suggestions

The Sanitary Heating Engineer Who Specializes — Gives "Special" Service and Procures "Special" Pay for so Doing—The Heat Regulator is the Best Conserver of Fuel.

"YOU wouldn't be bothered with specialties for the little profit there is in them? I used to think the same thing, but on June 20, 19—, I had some facts and figures placed before me which changed my way of thinking. As a result, I was induced to take up the sale and installation of thermostats for residences, and from that date up to June 20 of next year I made a clear profit of slightly over $600 on them alone. At the narrow margin heating contracts have to be taken these days that sum represents the profit on a good many heating contracts. It has certainly been the easiest money I have made in either the heating or plumbing game."

These words were spoken at one of the master plumbers' conventions during the past season while standing in the lobby of a hotel waiting for an opportunity to ask a question of one of the three plumbers and steam fitters who, as it was soon learned, were discussing the question of men of their craft attempting to branch out beyond the handling and installing of other than what may be termed straight out-and-out plumbing and heating goods. The editor apologized for interrupting them and explained that he was interested also in the suject and expressed a wish to have the discussion continued in his presence.

"If you did that in your town," said Mr. E——, one of the three, "I don't see why Mr. R—— here and myself can't do just as well. Our towns are fully as large as yours, our lines are the same and competition is much the same everywhere throughout the state. If I can make $600 this year out of heat regulators, or any specialty, I want to do it, and I believe you will be good enough to explain your scheme to us."

"If anyone will show me how I can make $600 or even $60 extra a year I am willing to take a chance on any reasonable scheme," added Mr. R——.

"As I said before," continued Mr. A——, "I made $600 out of these heat regulators last year, and I know from experience that every man who does a heating business can make some extra money by taking them up. The amount, of course, will depend on several things, but the scheme is worth trying.

The Salesman's Suggestion

"On June 20 last year a boiler salesman from Detroit dropped into my office and after getting my order for two boilers, some radiation and valves, we talked for a little while about the outlook for business. I complained that competition was so keen that there was but little money in the heating business any more.

"He then said he thought we plumbers and steam fitters were making a mistake in sticking so close to the staples in these lines. He pointed out that naturally there would be keen competition in goods which everyone handled and work which everyone could do. He told me of a plumber and fitter he knew who had made what many would consider a nice profit last year out of handling such specialties as heat regulators, vacuum cleaners, washing machines, electric kitchen appliances such as smoothing irons, toasters and the like, windmills, lighting fixtures and acetylene gas lighting plants.

"Our talk finally drifted around to the heat regulators, for I could see there was a good chance for these and I might be able to make some sales without much trouble. I asked the salesman what he knew about the different heat regulators on the market and what ones he would advise me to handle.

"We had a long talk in which he told me what he knew about the different makes. He advised me to get catalogues of the different makes, study them up and be prepared to furnish any one to a customer. This I found afterwards was good advice, because there are regulators which can be sold from $25 to $60. Sometimes a customer can only afford to buy the cheaper one, while others will select a more expensive one.

Plan of Selling

"Now for my plan! Before the salesman left my office, I had him give me the names and addresses of every thermostat manufacturer he could remember. I then wrote a letter to every one of them, stating that I would like to have their catalogues and would be glad to have them write me in detail, outlining reasons that I could put before a customer to induce him to install their particular heat regulator. I received the catalogues very promptly as well as some very interesting and instructive letters.

"During the next two weeks I made a careful study of these catalogues and letters so that I could explain quite readily how the different regulators worked and also prepare what I call my selling arguments, which I use when talking to a customer to try to get him to install a regulator.

"As soon as I was sure that I thoroughly understood the construction of the different makes and was perfectly familiar with the claims made by the several manufacturers for every particular type of heat regulator, I decided to see what I could do in selling a heat regulator on every heating contract I booked.

The First Attempt

"A few mornings after this a man to whom I had given a figure on installing a heating system in his new residence came to my office to give me the contract. The heating system was to be about of the average steam type, and as this man was going to live in the house himself, he wanted everything to be satisfactorily done. After I had revised my figures in accordance with some changes which he wished made and we had signed the contract, I broached the subject of his having a heating regulator attached to the boiler.

The Selling Arguments

"At first he was not disposed to consider the matter, as he thought it an unnecessary expense. I made up my mind at once that this was a good place to try out my salesmanship. I first started in on the extra comfort and convenience which he would derive from having a heat regulator in connection with his heating system. I explained to him that I could sell him a heat regulator which would automatically control the drafts so that the heating system would maintain whatever ordinary temperature he might desire in his living rooms without any trips by him or his servants to the basement to open or close the drafts. I also pointed out to him that on retiring at night he could set this regulator to maintain a much lower temperature in the house during the night, thus insuring against the fire go-

ing out and then have the drafts automatically regulated in the morning so that the rooms would be at a comfortable temperature before it was time to get up in the morning. I pointed out this feature alone was worth the price of the regulator because by its use he would avoid the discomfort of having to go down to the heater early in the morning when the house was cold to start up the fire and then wait for some little time before the temperature in the rooms became comfortable.

"I also pointed out that after dinner in the evening when he had settled down for an evening's rest he would not have to get up now and then to go down to the cellar to operate the drafts on the heater, should the room become too warm or too cold as it is most likely to do when a heater is not provided with automatic draft regulation. I told him that if he had the proper type of heat regulator this would all be attended to automatically and a uniform temperature of 70 deg., if so desired, would be maintained in the room without any trips to the basement except, say, two or three times a day to place coal on the fire. I then told him that both he and his family would enjoy better health if an even temperature were maintained in his home than if he failed to provide the heat regulator when the temperature in the living rooms would be likely to vary considerably, and that certain times they would be suffering from overheating, while at other times the room would be too cold to be comfortable.

"Another point I brought to his attention was the fact that the servants, if he kept any, would be more likely to be better contented if he had a heat regulator, as they would not have to get up in a cold room in the morning or work around the kitchen or dining room before it became comfortable.

Customer Becomes Interested

"These arguments aroused his interest somewhat and he asked me how much one of these heat regulators would cost. I told him that there were a number of different kinds ranging in price from $25 to $60, and I would be glad to explain the differences in construction and would let him choose the type for himself.

The Economy Argument

"I told him, however, before getting out any of the catalogues that a most important point to keep in mind in deciding this question of having a heat regulator installed was the question of economy. I called his attention to the fact that every time the temperature in his house became too high, or higher than he desired, he would know that he was wasting fuel. I told him that if he had a heat regulator which would prevent the temperature in the house going above the comfortable degree desired, he would in this way save fuel.

Saving in Fuel

"I then picked out one of the regulator catalogues which contained two charts, one showing a record of temperatures for a day in a house when no heat regulator was attached to the heater, and then another chart showing the temperature in a house during a week after the heat regulator had been put on when the weather conditions outside were about the same. In the chart where no heat regulator was used the line indicating the temperature was very wavy and frequently went up as high as 80 deg. and sometimes down as low as 65 deg., while in the case of the heater which was equipped with the heat regulator, the line was almost uniformly on the 70-deg. mark during the daytime as desired and never over a degree above. I used this to impress on him the fact that the heat regulator had thus saved the amount of fuel which would be necessary to raise the temperature of the room from 70 deg. up to 80 deg. as often as the record showed the temperature had been raised to that point.

"I called his attention to the fact that statements had been made that in ordinary weather it was only necessary to make two trips per day to the basement to put coal on the heater when a heat regulator was installed, and I asked him to judge from his own experience if such conditions had existed in houses where no heater had been installed which had come under his notice, and made the statement that if he were only to save a shovelful of coal per day, which is about 10 lbs., it means that he would save a ton in the season. I then called his attention to the fact that aside from the increased comfort and satisfaction he would derive he would make a saving of at least the cost of one ton of coal per year. I did not forget to tell him that this saving would be repeated each year and that instead of the heat regulator being an expense it would really be an investment.

"I also pointed out as a matter of economy that there would be less wear and tear on the heating system, especially the boiler, if the fire were allowed to burn uniformly and never get overheated, which would be the case if no heat regulator were installed. I pointed out that there would be less repair bills for grates and less broken sections if a heat regulator were used. I also pointed out that while explosions in house heating boilers are few, the danger from such an accident is minimized by the use of a heat regulator because it will check the fire and not allow a sufficient amount of steam pressure to be generated to cause an explosion.

"I also pointed out with a heat regulator the combustion is more uniform and the coal is more completely consumed with the steady fire which prevails with a heat regulator than with the intense fire at one time and the slow fire at another which is likely to happen in the absence of a heat regulator.

"Another advantage I pointed o that with a heat regulator there is less danger of fire starting from overheating than if no heat regulator is placed on the heater.

"By this time he had become interested and was anxious to learn about the different types of regulators I could sell him. I first told him that I could sell him a regulator which would operate the drafts at stated hours and explained that these worked with a time attachment; that all he had to do was to set the clock for the time at which he wished the draft to open or close and that when that particular hour arrived the mechanism would be operated by the clock as desired. I then explained the different types from this time attachment only to the automatic type which operates the damper as a direct result of the temperature of the room on the thermostat. I also told him that he could have a combination time attachment and automatic heat regulator if he desired.

MARKET FOR PLUMBING SUPPLIES

An increasing demand for modern plumbing is indicated in reports from the Dominican Republic. The lack of water works and a sewerage system has no doubt retarded the general installation of modern plumbing in the capital city, and it has been only recently that well equipped bathrooms and toilets have been installed in the more pretentious of the older residences.

Since the growth of the American colony there has been a great demand for residences with modern conveniences and consequently in nearly all the new houses constructed, and those in process of construction, a convenient bathroom is considered a necessity. To keep abreast of the time toilets and baths are also being installed in many of the old buildings.

There are but few experienced plumbers in the city of Santo Domingo, not more than four or five in all.

All plumbing supplies are imported from the United States. A bathroom may be installed within the following range of prices: Bathtub, from $30 to $36; toilet, $20 to $25; and lavatory, $10 to $15. Workmen and piping will require an expenditure of $40 to $50 in addition.

Bathtubs, etc., are classified under paragraphs 163 of the Dominican tariff, as follows:

Paragraph 163, bathtubs, sitting and hip baths, wash basins or stands, for pipe connections or not, enameled, porcelain lined or not, G. W., 100 kilos, $2.50.

In addition to the above there is a municipal tax of $1.10 per 100 kilos (1 kilo=2.2 pounds) net weight.

Sir Arthur Lee, whose magnificent gift of his country mansion to be a residence in perpetuity for British Prime Ministers has recently brought his name prominently before the public, spent some time during his early life mining for gold in the Klondyke.

A Plumber's Christmas Story

The Christmas Hamper Has Gone—It No More Lightens up the Home as in Days Gone By, But Memories Still Live—This Story is True and Actually Took Place in a Lancashire Coast Town About the Year 1885.

By One of the Family.

SCENE, kitchen of a four roomed cottage, 7 p.m. Christmas Eve, and Saturday at that. Grandfather, father, mother and four chicks, the oldest 11 years, sitting round the fire and a real stormy evening it was.

Business had been none too good that year, but Bob Stansfield had made a little progress, in spite of the fact that it was his first year in business. There was no Christmas tree, however, and Santa Claus didn't seem as if he was going to call that night. Bob was the kind of fellow who felt a great deal more happy when paying his debts than most fellows do and one of his creditors had pressed him a little harder than usual, "so that we can close our books before the year is out." By dint of struggling and by denying himself and family everything but the bare necessities, Bob had managed to square his account with the firm in question the previous day and had been relying on being able to collect a few odd accounts which were overdue to furnish the family with a little of the customary Christmas cheer. Luck, however, seemed to have been against him that day. He had just got back home and had not been able to collect a single shilling, gloomy looks and silence reigned.

But what is it that has stopped at the door? Rat-tat-tat. Up jumps the old grandad, and off he steps to open the door. A big brawny fellow yells: "Is this where Bob Stansfield lives?" "Aye, to be sure it is." "Well here's a hamper for yer, I wish to the Lord folk 'ud put reight addresses on ther bloomin' things, I don't suppose there's ony other Bob Stansfield i' this tarn ony way, so it must be yoar hamper, ony ha', I'm bahn to leave it. Is tha name Bob or what?" said the driver.

"Noaw, but I'll fetch Bob to sign his name for it, I suppose that's what tha wants, isn't it?" says the old grandad.

"Aye, fetch him aht," and out comes Bob, signs his name, slams the door and —well, the spirit of the scene is changed. The hamper is now the centre of attraction, a big turkey's head, tails of a brace of pheasants, the feet of a couple of hares, are projecting from between the lid and the hamper itself, and every one of the family first looks at the hamper, then at each other. Grandad is the first to break the silence. "Well Bob, what's matter wi' thee, art er skeered or what." "Noaw, I'm noan skeered, but some way or uther I doan't think that hamper is fer me, tha knows.

"Well," says grandad, "have a look at t'label and if it's thy name 'at's on it, then it must be thy basket."

Bob screws up courage and looks at the label, first one side and then the other. On one side plain as day there appears the name "Robert Stansfield, B————," and on the other side "With the Compliments of J. C. Lyons, E————, Wishing you the Compliments of the Season."

Well, Bob was fairly flabbergasted, it was certainly from Mr. Lyons, the traveller for ————, plumbers' brass manufacturers, the very firm who a few days ago were so anxious to "close their books before the end of the year." So after all Bob and the family were likely to have a good Christmas.

But somehow Bob didn't feel easy about that hamper. He had always beaten Mr. Lyons down, and had not always been as prompt in settling his accounts with them, even though he had managed to close the year with a clean sheet, and had been a fairly good customer all round. The old grandad, however, could not contain himself any longer, and again exclaimed, "Bob, what's matter with thee? Is that thy name on t'label? If it is, then it's thy basket and what's more, I'm going to oppen it mysel if th'art flaid o' doin' it thysel." Suiting the action to the words, he pulled out an old, but sharp, sailor's knife and soon had the lid raised.

My! the contents of that basket! A big 17 lb. turkey, cleaned and trussed, a brace of pheasants, a couple of the biggest hares, bottles of choice wine, nuts, raisins, Christmas stockings, oranges, apples, candy, and a whole lot of toys. It was the best and biggest hamper ever filled up, and it filled the hearts of every member of that family to overflowing. Tom, that's "me," had never seen such a hamper and never will again.

The first thing Bob did was to write a very nice letter to Mr. Lyons, which read something like this:

Dear Mr. Lyons,—The hamper arrived safe and sound and I fail to know how to express myself. It was very kind of you to think of us, and as it is Christmas time I feel I cannot refain from telling you that had it not been for you, and you only, we would have had a very miserable Christmas.

I had a number of accounts out, and when I settled your bill it left me with very little, so I was depending upon collecting some of the money I had out, to buy some "Christmas cheer." But I failed miserably, and was nearly at my wits' end when the hamper arrived.

I shall never forget your kindness, and you can rest assured of receiving most of my business during next year. Pardon me closing in such an abrupt manner, as the children and my dear wife and our granddad are at their wits' end with joy.

Yours very truly,
BOB STANSFIELD.

So that was the beginning of what a few moments before had appeared was to be a miserable Santa Claus-less Christmas. That Christmas week was the happiest ever. Not a care, and the weather cleared up, a nice cloak of snow covered the ground and no frozen pipes burst to remind Bob of work for all that week.

Saturday again came round, the New Year's Eve, or rather the morning, and there was a rap at the door loud enough to waken the dead. Bob answered the knock and opened the door to find the driver standing there that had left the hamper the week before. Says he:

"Is this the place where I left a hamper last Saturday night?"

"Sure," said Bob. "Well, I've come back for it. It belongs to a parson that lives on ———— street and I'll likely get the sack for leaving it at t'wrong place."

Bob nearly collapsed, he didn't know what to say. By this time his wife, who had heard the driver ask for the hamper, came to the door, and, like Bob, just stared at the driver in amazement. Not knowing what was passing through their minds, the driver asked why the hamper was not forthcoming, and was told that he could not get it, because the contents had been eaten.

All that could be done was to produce the label which would prove that the hamper bore the name, etc., but to cap the lot, Bob declared that the driver must be wrong because he, Bob, knew the gentleman who had sent the hamper.

But this did not suit the requirements of the driver, and he then told how the brother-in-law of the new parson, whose name was a Mr. Lyons of ————, had written the railway company asking why the hamper had not been delivered to the Rev. Robert Stansfield of ————. So there was nothing for it but that Bob should call upon the new parson, who it seemed bore the same name as he. Off he went, then, and the driver took the label in the hope that on account of there being no street number on it, he would be able to clear himself in the matter.

The parson heard Bob's story and was ever so pleased to find that it had made an honest man and his family happy, and would not hear of any payment which Bob offered and as far as the parson was concerned the matter was closed. But this is not the end.

About 4 p.m. that afternoon there came another knock at the door followed by a shuffling sound; a big hamper was standing at the door, and a driver with book in hand asking someone to come and sign. The writer was this time the first to get there, but too young to sign.

(Continued on page 16.)

Air and the Deterioration of Pipe

Being a Letter to the Editor From R. N. Murphy, Ottawa, Requesting That the Problem be Discussed in Sanitary Engineer, Together with a Reply by Mr. James Smith, Chief Plumbing Inspector, Winnipeg—Other Replies Will Follow.

THE article by Mr. W. M. Scott, consulting hydraulic and sanitary engineer of Winnipeg, Man., which appeared on page 17 in the SANITARY ENGINEER of October 15, regarding main house trap is very interesting. He claims that sewers have been known to freeze for a distance of from 100 to 150 feet from the man hole, in cases where there is no trap. He claims further, that the admission of too much cold air is the cause of this. If his contention is right, (and I am of the opinion that it is,) then it is a mistake to put too many vents on our sewers and it would also be a mistake to put a fresh air breather on the house side of the main house trap.

Speaking of the merits of cast iron and wrought iron pipe when used for soil and waste pipe, Garrett E. Franklin, secretary of the Toronto Society of Domestic, Sanitary and Heating Engineers, makes the statement that taking together all the painstaking research that has been carried on since the year 1800 we will find that one common point has always been agreed upon; that is, that iron must be in direct contact with dampness and oxygen before rusting can take place. He also says that he agrees with the article in *The Financial Post* of September 15, 1917, in which it was stated that cast iron pipe had been in use in the old Astor Hotel in New York for over eighty years and when that building was torn down this cast iron pipe was found to be as good as new, in contrast with the city hall in Chicago where the wrought iron pipe is in a dreadful condition after only about ten years.

Now those two statements have a direct bearing upon one another in that they go to prove that iron of any kind corrodes and rusts quicker under our modern systems of plumbing than in the plumbing systems as practised eighty years ago.

It is an indisputable fact that the plumbing as it was practised eighty years ago contained absolutely no provision for the free circulation of fresh air, while in every case where sanitary plumbing is put in by the latest methods air is allowed to freely circulate through all the piping. In this fact is found reason for the quicker deterioration of all piping in our modern systems.

Take for instance soil pipe stacks where they are installed without a main house trap; this pipe may become damp and dry out several times in a day. The currents of damp air from the sewers sometimes pass outward through such stacks and then immediately these may reverse and the stack that is acting as an outlet for damp air will suddenly become an inlet for dry air, causing the piping to be wet at one time and dried out immediately after. This is the quickest and surest way to bring about deterioration and decay of everything, iron, cast iron, steel, wood, or even life itself, and it is one of the great fundamental laws of this universe that cannot be disputed. Take for instance wood: there are many kinds which if kept perfectly dry will last practically for ever, and if kept in a place where they will become damp and dry alternately they will last but for a very short space of time, and yet the same wood if it be submerged in water or in any place where it is always kept damp and the air be excluded has been known under such conditions to be in good preservation after hundred of years.

If any more information be required as to the life of wrought iron pipe under the old and the new methods I am in a position to give the results of many practical tests in this city. In one case where wrought iron pipe was used for vent pipe and was in use for a little less than four years it was so deteriorated with rust and scale that the falling rust had completely blocked the elbows and other fittings leading off horizontally. This is under our modern air vent systems with no main trap.

Another wrought iron pipe was installed in an office some 35 or 40 years ago and used as a basin waste to which several basins were attached. This waste was run horizontally for a distance of over 50 feet, completely ending at the furthest basin with a trap and having no inlet of air at the terminal point. I myself had this pipe taken apart and cleaned some three years ago and found it to be in a perfect state of preservation and I believe that had the air been allowed free passage through this pipe it would have long since been useless. I might add that this is a case where the main drain of this latter building was trapped. One of these can yet be seen at Allan and Cochrane's drug store, and the other in the West Block on Parliament Hill.

Wrought iron pipe, if the air be excluded as in the case of hot water heating systems, will last for ages so long as it is protected from the outside air by a coating of good paint or other good airtight compound. The same pipe used in steam heating systems does not keep in such good condition nor last so long as in the hot water systems; and in this again we find another proof that the circulation of air through the pipes causes quicker decay, in that the steam system takes in greater quantities of air than the hot water system. This is caused by the air being driven out while the steam rises; and when the steam condenses and the water returns to the boiler the radiators and piping become filled with air, but in the case of hot water no air is taken in unless the system be emptied or tampered with.

To use wrought iron pipe as soil or waste or vent pipe is out of the question where the air is allowed to circulate freely through them; and the installation of the same will only be a loss of time and material, for their life will be very short indeed compared with cast iron pipe. It does not take hundreds of years to decide this question for if you throw the two side by side on the damp ground and leave them there for thirty days exposed to the sun, rain and dampness of the earth, you will find that the wrought iron will have a coat of rust that you can scrape off with a stick and that the cast iron pipe will be as fresh as ever. Iron pipe that will lie on the damp ground for a space of three years at the longest will crumble to pieces in your hands, while the cast iron pipe, under the same conditions, will remain as good as new. This is probably due to the cast iron being in its natural state and the wrought iron being made under great pressure by an artificial process.

Scores and scores of times have I taken wrought iron pipe from under floors and from the ground completely decayed, while the cast iron fittings on the same would be in as good condition as ever; also have I taken coils out of furnaces where the wrought iron pipe would be all eaten away and the cast iron fittings on the same would be in good condition and last for many more years. In these cases of course the scaling and decaying takes place from the outside of the piping, due to the action of the air and the dampness.

I write you this article to prove that it is a combination of air and dampness that causes any iron to decay; that dampness itself will not do it. This is proven by the fact that pipe does not deteriorate in hot water heating systems from the inside, for the reason that if the water is brought to a boil or nearly so the air is separated therefrom and the same water remains in the piping practically from one year's end to another. Such water has no deteriorating effect upon the piping, no matter what kind of piping it may be.

It is to prove also that a system of plumbing through which the air is allowed to circulate is not as good from a lasting point of view as a system

(Continued on page 32.)

Particulars of Plumbing Systems in Large Buildings in Winnipeg, Manitoba

NAME	Location	Height	Drains	Stacks	Waste and Vents	When Instal'd
C.P.R. Depot	Higgins Ave.	4 Floors	Cast Iron	Asphalt Wro't Iron	Asphalt Wro't Iron	1905
C.P.R. Hotel	" "	8 "	" "	" " "	" " "	1905
C.P.R. Hotel Addit'n	" "	8 "	" "	Gal. Wro't Iron	Gal. Wro't Iron	1915
Confederation Life	Main Street	9 "	" "	Cast Iron	" " "	1912
Union Bank	" "	10 "	" "	Gal. Wro't Iron	" " "	1904
Bank of Toronto	" "	3 "	" "	Cast Iron	" " "	1906
Can. Bk. of Com.	" "	6 "	" "	Gal. Wro't Iron	" " "	1911
Royal Bank	" "	4 "	" "	" " "	" " "	1910
Union Trust Co.	" "	13 "	" "	" " "	" " "	1912
Merchants Bank	" "	7 "	" "	" " "	" " "	1913
Bank of Montreal	" "	3 "	" "	" " "	" " "	1910
Allan Bldg.	" "	6 "	" "	Cast Iron	" " "	1911
Gt. West Per. Bldg.	" "	8 "	" "	" "	" " "	1913
Union Station	" "	3 "	" "	Gal. Wro't Iron	" " "	1910
Fort Garry Hotel	Broadway	13 "	" "	" " "	" " "	1913
New Law Court	"	3 "	" "	" " "	" " "	1913
New Parliament Blg.	"	4 "	" "	" " "	" " "	1915
McArthur Bldg.	Portage Ave.	12 "	" "	Cast Iron	" " "	1910
Quebec Bank	" "	4 "	" "	Gal. Wro't Iron	" " "	1914
Currie Bldg.	" "	2 "	" "	" " "	" " "	1915
Paris Bldg.	" "	11 "	" "	" " "	" " "	1915
Sterling Bank	" "	8 "	" "	Cast Iron	Vents above 2½ cast iron, W. and V. up to 2½ gals., W.I.	1911
Boyd Bldg.	" "	9 "	" "	" "	" " "	1912
Carlton Bldg.	" "	3 "	" "	Gal. Wro't Iron	Gal. Wro't Iron	1911
Electric Chambers	Notre Dame Ave.	11 "	" "	" " "	" " "	1912
Gen. Hosp., new sect.	Bannatyne Ave.	6 "	" "	" " "	" " "	1911
West wing, old sect.	" "	4 "	" "	" " "	" " "	1916
Trust & Loan Co.	Portage Ave. (E)	8 "	" "	Cast Iron	Asphalt Wro't Iron	1911
Gt. West Life Bldg.	Lombard St.	4 "	" "	" "	Gal. Wro't Iron	1910
Grain Ex., old sect.	" "	7 "	" "	Asphalt Wro't Iron	Asphalt Wro't Iron	1907
Grain Ex., new sect.	" "	10 "	" "	Cast Iron	Gal. Wro't Iron	1913
Bank of Hamilton	Main St.	9 "	" "	Gal. Wro't Iron	" " "	1917
T. Eaton, new wing, house	Hargrave St.	8 "	Gal. W. I.	" " "	" " "	1916
Public Press Bldg.	Vaughan St.	3 "	Cast Iron	Cast Iron	" " "	1917
Tribune Bldg.	Smith St.	6 "	" "	" "	" " "	1913
Free Press Bldg.	Carlton St.	6 "	" "	" "	" " "	1912

The above should be of great value to every thinking sanitary engineer, having regard to the fact that extensive repairs will have to be undertaken in the near future.

It will, however, be noted that the owners of those buildings in which cast iron soil waste and drains are installed appear to have given the matter much thought.

For example, the old section of the grain exchange building erected in 1907 was fitted with wrought iron pipe for stacks, etc. But the new section erected in 1913 has cast iron soil pipe and fittings installed.

Another thing, too, is apparent, that only one building out of the whole has used wrought iron pipe for drains and this has been galvanized.

The whole list also shows that most of the buildings recently erected have favored cast iron soil pipe as far as possible.

EDITOR.

Importance of Humidity to Health

Being the Opinions Expressed by Persons Who Have Experienced the Benefits to be Acquired in a Home Where Humidifiers Are in Operation — This Article is Full of Good Selling Hints.

ARTICLE 4.

THERE is no question connected with the heating of a home more interesting than that of humidity. In this article, therefore, we give the experiences of two people who have used humidifiers.

One user of a type that necessitated the insertion of a coil or heater in the furnace and was furnished with a dropping valve to supply the water said:

"Several years ago I was persuaded to instal a ———— humidifier, I took out the coil that was in the furnace so as to make room for the heating part of the humidifier, but somehow or other did not think it was any good. I kept it in, however, a whole winter season. My house contains 13 rooms and I have a number of thermometers in various parts of the house, I did notice however, that we never required to have more than 65 to 67 degrees of heat and always felt comfortable. But I was not convinced that the humidifier was any good, so had it taken out.

The second winter, we saw, after about the first month, the true value of the humidifier. The furniture began to crack, our lips were dry in the morning upon rising, and before the winter was half over the whole family had suffered more or less from coughs and colds, a condition never found the winter before. It cost me a lot of money to have the furniture fixed, but we have the ———— humidifier back again doing its bit towards keeping us all well, and believe me, it's the last thing we would dispense with under any conditions. I would not be without some form of humidifying appliance in my home were it to cost as much as all the rest of the heating system to instal. We, never have colds in the family now, and the absence of dust and dryness is very noticeable."

Another person interviewed recently said that none of their family appeared to be very strong. Coughs and colds, and other bronchial troubles were the rule of the day every winter. So the writer suggested that some kind of humidifying appliance be installed, but was pooh-poohed until finally as an experiment it was decided to cut up some old comforters and soak them in water, hang them over the radiators, and at intervals go round and pour water over the comforters to keep them saturated with moisture. Several members of the family had colds and in less than a week every one was in the best of health. The house was fitted up with humidifiers and it was possible to reduce the amount of coal used in the furnace.

This does not by any means go to prove that less fuel would be consumed, but rather that the fuel used to create moist air by evaporation of water would make the air better to consume. Instead of having the furnace give off all the heat needed, the body of a person is assisted somewhat to generate more heat from having breathed a moister air.

We question very much if there is a more important problem to solve than that of furnishing humidity in proper proportions to our residential and other buildings. We take care to have a large enough furnace, we have by-laws that govern plumbing and the proper sizes of pipe etc., but not a line or word in our building by-laws or even health laws that demands that sufficient heat, moisture or air be changed a certain number of times a day.

It is surprising to note how many kinds of appliances for increasing the moisture in the air there are on the market, and yet there are so few in operation. It is, in the opinion of the writer, all a matter of salesmanship that is lacking in the make-up of the average sanitary and heating engineer—simply a case of failure to show every householder the need for such appliances. Let him be convinced of their necessity and they will be procured. But first of all the customer must be convinced. Show him or her that humidity is just as necessary to the health and life of every human being, as that boiling water is necessary to brew tea with.

The writer has many times stated, and still holds the same opinion, that the science of merchandising, of salesmanship, is about the only thing lacking in the average sanitary and heating engineer, and we all have scores of things to sell.

Humidification by Mechanical Means

It is a physical fact that evaporation ordinarily takes place at any temperature from any body of water. Out of doors the evaporation from lakes, rivers, ponds, etc., provides sufficient moisture for our needs, and is one reason why we find life in the open so healthful. In artificially heated rooms the source of water for the evaporation is generally moisture from the wood and materials of furniture or from our own bodies. To prevent such a condition other sources of water must be provided, and in the preceding articles the methods described for doing this have been but a modification of nature's method and dependent on the fact that by heating the evaporation of water is accelerated.

If heated to the boiling point all of the water is forced to evaporate, forming "steam." This is evidently a very positive way of getting moisture into the air. But the "steam" method with its necessarily high temperature has some disadvantages in certain cases. Mechanical means have therefore been devised for forcing the evaporation of water at ordinary temperatures. Such means are employed mostly in factories in the manufacture of goods requiring a moist atmosphere for the best results.

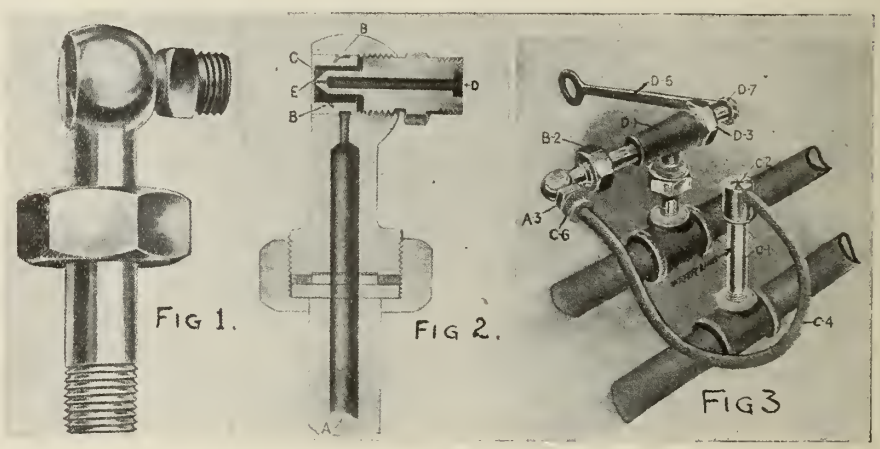


FIG 1. FIG 2. FIG 3

The Turbo Humidifier

The "Turbo" head is illustrated in Fig. 1. How it works may be gathered from the following description and by reference to Fig. 2, which shows a sectional cut of the head.

Air is supplied at the required pressure at the orifice A; passes through the tangential orifices in the bushing, B-B; produces a vacuum at the end of the water nozzle E; and by so doing, draws

water through the tube marked D.

It is claimed that the centrifugal motion imparted to the air by the "Turbo" principle actually pulverizes the water in the chamber C before it is delivered to the atmosphere, spreads the vapor and distributes it before condensation can occur.

A description of the complete "Turbo" system is something like this:

Air under pressure is supplied through a main pipe to the several branch lines in which the heads are located. Parallel with these branch air lines are water lines run on a dead level.

Water is supplied through a covered, float-controlled tank. This tank is equipped with over-flow pipe, small filter if necessary and is covered to keep out dust and lint. In size it is like that furnished with any complete toilet room set. It is claimed that one of these tanks will supply from sixty to seventy heads, but in large rooms, the best practice is to divide the system into a number of separate sections. The tanks should be located in easily accessible place. The water line, controlled by the overflow pipe, is located 1½ inches below the centre line of the head. It would therefore appear impossible, whether the water line be shut off or not, for water to overflow from the heads; for when the air is shut off there is no power to lift the water up to and into the head.

Referring to Fig. 3 which gives a good idea of the system, the water inlet to the head is connected to the riser nipple (C-1) in the water branch pipe by means of a non-corrosive, flexible, metallic tube (C-4), which being provided with union connections (B-2), (C-6), should make all parts readily accessible and adjustments easy. Two unions, one vertical and the other horizontal, make it possible to direct the jet in any desired direction.

A fine mesh brass gauze strainer for

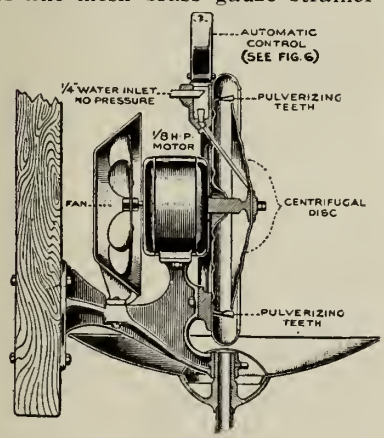


Fig. 4.

the air connection is located in the union (B-2). Any foreign substance passing this strainer is small enough to pass through the air ports of the head. The valve or cock (D-1) is so located that any head may be shut down without interfering with the others on the same line. Shutting off the air at the valve shuts down the head.

To evaporate water by the "Turbo" principle no heat is required, but compressed air must be provided. It is understood that this is most satisfactorily accomplished in most factories using the system by an independently driven air compressor.

The important claim for the "Turbo"

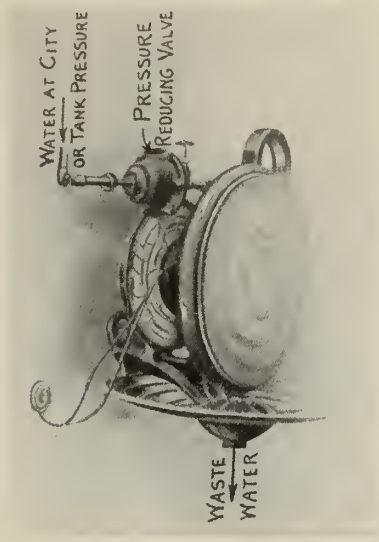


Fig. 5.

system is made that all the water passing through the humidifiers just described is vaporized.

The Normal Air Humidifier

"In all textile mills, humidity is almost a necessity. From the earliest times, these mills have been located in valleys, beside streams, or else the weaving processes have gone on in cellars on account of the dampness. The great success attained in Lancashire, England, and in the surrounding counties, both in cotton and wool, are really the result of the exceptionally humid conditions ordinarily found there."

"The quantity of uncombined water present in any fabric has a marked influence upon the weight and strength of the fabric, and also, to a less degree, upon the width and elongation and the crimp of the yarn."

On this continent, where the atmosphere is generally less humid than in European countries, artificial humidifiers are therefore generally necessary in woolen and cotton mills and particularly so when the mills are artificially heated.

In bakeries, in the manufacture of products from tobacco and leather and in silk manufacture means for keeping the relative humidity at a constant percentage are very essential. It is understood that the "Normalair" humidifiers are successfully employed in these and various other lines. As the method used is applicable to domestic humidification, the apparatus will be described at some length here.

The essential feature of the "Normalair Humidifier" (see figures 4 and 5) is a copper disc 16 in. in diameter, rapidly revolving, and a great number of copper teeth on a stationary grid placed near, but not touching, the rim of the disc. A small stream of water is fed, by gravity, through a control chamber, to a point near the centre of the disc. Centrifugal force spreads this water evenly over the back of the disc, and throws it off from the rim in a very thin film against the copper teeth. The size and speed of the disc are designed to give the water, when it strikes the teeth, a velocity of over 7,000 feet per minute. It is claimed that the terrific force of the impact breaks up the already thin film of water into infinitesimal particles, or vapor. The disc and grid are protected by a case which is open only in front. The disc is on one end of the shaft of a ⅛-horsepower motor connected to a lighting circuit, and on the other end of the motor shaft is mounted a fan which produces a strong blast of air over the edge of the case. All the particles of water which are fine enough to float out into this blast of air are caught up and carried out into the room. The fan also serves the additional purpose of causing a circulation of air in the room, which not only insures perfect distribution of the humidity, but also is highly desirable from the standpoint of health.

In the blast of air from the fan, and behind the vapor-producing disc and grid, is mounted the automatic control (see Fig. 6). This consists of a bow-shaped piece of selected material (originally of wood) which is extremely sensitive to atmospheric conditions. By a very ingenious arrangement, the swelling and contraction of the bow, due to changes in humidity, are utilized to actuate a deflector, which diverts the flow of water from the whirling disc. The connection between the bow and the deflector slide is adjustable, to permit setting the control for any relative humid-

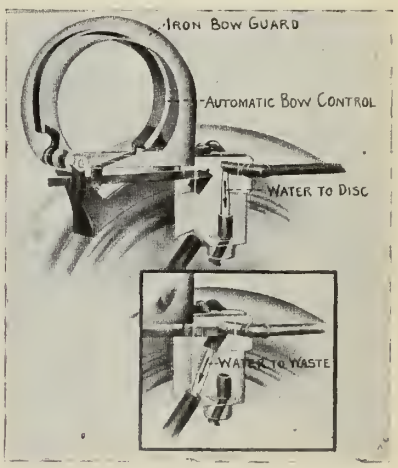


Fig. 6.

ity desired. Referring to Fig. 6, the upper illustration shows the control withdrawing the deflector-arm and permitting the water to reach the whirling disc and be pulverized into vapor; the smaller illustrations shows the detail of the regulator box, with the deflector deflecting the water into the overflow.

In the average home it would be easy

(Continued on page 16)

Toronto Society Holds a Social Evening

West Enders' Club Hold Get-together Social Evening—It Was a Success From Start to Finish and a Large Crowd Did Justice to the Good Things Provided.

THE West Enders' Club of the Toronto Society of Domestic Sanitary and Heating Engineers held a most successful "get-together" of those engaged in the plumbing and heating business in the west end of the city, on Tuesday evening, December 11th, 1917, commencing at 7 p.m., in the dining room of the Canadian Foresters' Hall, 22 College Street.

Chairman P. J. Hayes, of the West Enders' Club, presided in his most capable manner, and was ably assisted by a committee of John A. Lillie, Sam Y. Meredith, and Garrett F. Frankland, secretary of the Toronto Society of Domestic Sanitary and Heating Engineers.

Sharp at 7 p.m. all hands sat down to a bounteous repast, splendidly served by R. P. Morrison & Co., caterers, the following being the menu:

Chicken Soup.
Roast Young Turkey, Stuffed.
Cranberry Sauce.
Creamed Potatoes. Buttered Carrots.
Parkerhouse Rolls. Bread and Butter.
Pickles. Celery.
Assorted Cakes.
Fruit Pudding, with Caramel Sauce.
Ice Cream.
Lemonade. Coffee.
Nuts.

"Eat and the world eats with you,
Fast and you starve alone.
Dig right in and help yourself,
And make yourself at home."

Motto:

United we stand,
Divided we fall;
So get together
One and all.

Music was continuous during the "eats," and was taken care of by that celebrated artist, Dick Hearn, who gave everything from ragtime to grand opera, and then some.

Old-timers, young uns, and others of the west end joined together in what was one of the most successful gatherings of our craft that has been held in Toronto in a long time. Confidence in one another was the keynote throughout, and a firm resolve by all to live and let live was the outcome of the evening. A general get-together spirit prevailed throughout the evening, and all hands were unanimous in approving the efforts of the West Enders' Club, the objects of which are to improve existing trade conditions that are so prevalent among the members of the craft, and more especially in the west end of Toronto.

The West Enders' Club did themselves proud, and the guests of the evening were loud in their praise of the most hearty manner in which hospitality was served out to all, each and every one present being made to feel at home. All present joined in wishing success to the West Enders' Club, and with the memory of this gathering ever before them they unitedly joined in the words of the following verse, which aptly describes the evening of get-together:

If I knew you and you knew me—
If both of us could clearly see,
And with an inner sight divine
The meaning of your heart and mine,
I'm sure that we would differ less,
And clasp our hands in friendliness.
Our thoughts would pleasantly agree,
If I knew you and you knew me.

TRADE GOSSIP

Quebec, Que.—L. E. Labrecque, plumbers' supplies, has been registered.

LAYING GRAVITY MAIN

Aurora, Ont.—City Council has authorized the laying of 2,600 feet of six-inch gravity main from the new artesian well to the pump house.

INSTAL AIR CHAMBERS

Toronto, Ont.—Works Commissioner has been authorized to instal air chambers at the main waterworks pumping station. These air chambers are needed to safeguard the machinery in case of the temporary suspension of the Hydro electric service. The cost is estimated at about $50,000.

WOUNDED AND MISSING

Mimico, Ont.—Lieut. Charles L. Heather, D.C.M., M.C., who before enlisting was in partnership with his father in a plumbing business here, is now listed as wounded and missing since November 11, having previously been reported wounded. Lt. Heather left with a second contingent battalion as a private. Rising rapidly from the ranks he received his commission November 30, 1916, after having been honored with the D. C.M. for singular coolness and bravery displayed while leading his company to an attack. He was reported wounded May 20, 1917, and on July 29 received the additional honor of having the Military Cross bestowed on him.

JUST PASSED ON

The only child, little son of W. C. Schultz, Toronto, passed on to the great beyond recently. He was in apparently good health and died rather suddenly. SANITARY ENGINEER regrets very much to hear this, as also will the many friends of Mr. and Mrs. Schultz. Both were very active workers in the Toronto Society of Domestic Sanitary and Heating Engineers.

NEW COMPANY

Port Colborne, Ont.—A new company known as Port Colborne Supply Company has been formed. The new organization has purchased the plumbing business of A. D. Cross and is for the present located in the building in the rear of the Cross hardware store. For the time being, the business is in charge of Mr. H. H. Ott. Mr. D. Reeb has been secured for the new company. The company will carry on a general plumbing and pipe fitting business and will later add several other lines.

IMPORTANCE OF HUMIDITY

(Continued from page 15.)

to supply the humidifier with either hot or cold water, as and when desired. The temperature of a room by this means could be considerably altered.

It is claimed that each "Normalair Humidifier" evaporates from 3 to 4 gallons of water per hour when required to work at its full capacity and that at normal temperatures it can keep 15,000 to 20,000 cubic feet of air space at as great a relative humidity as 90% if desired. For the ordinary house one "Normalair" humidifier would apparently have a large "factor of safety," as one-half gallon of water per hour in the form of vapor would be a great boon to the ordinary dry atmosphere of our winter homes and two gallons per hour would generally be more than ample. Also 20,000 cu. ft. is generally all the air space that requires to be humidified and then only to from 50 to 60%.

A PLUMBERS' CHRISTMAS STORY

(Continued from page 11.)

To that hamper was attached a label, upon which appeared the following address:

"Robert Stansfield, Esq.,
"Plumbing, Painter and Decorator,
"No. 7 ———— St.,
"B ————."

Sure enough there was no mistaking that address, so there was nothing for it but to sign for the hamper, which Bob did, and before the family had got over the surprise, a double knock at the door was heard and a shout "Post." The postman threw in a letter. Bob opened it and read as follows:

Robert Stansfield, Esq.

Dear Sir,—We regret very much that you found it necessary to have to give us the hint to send you a Christmas hamper. It has been our custom to send out a few hampers to some of our old friends in the trade, but as you were only a new customer and of short standing we had not included your name. However, as we find you have paid us quite a nice sum of money, that your account is paid up and that you promise us a big share of the next year's business, we have sent you a Christmas hamper via L. & Y. luggage train, and sincerely hope you will have a happy and prosperous New Year.

Yours very truly,

————.

It transpired that the traveller, Mr. Lyons, had a brother in the game and poultry business, and that the Rev. Robert Stansfield had married a sister of the Lyons brothers, thus the one brother sent his sister a hamper, and Bob Stansfield, the honest plumber, got the two.



Sanitary Engineer's Christmas Greetings

We are still at war, and we mourn. We mourn for the living and the dead. We who live may perchance be more dead than those whose spirit dieth not. But still we mourn. How then can we rejoice and make glad? except that by so doing we are carrying on the wishes of those who have fought and still fight, the wishes of those whose spirits still live that we who live on may live in peace.

As the words on this page are being penned before the glow of the fireside, the wind outside is howling and the snow is falling fast, and one cannot keep from thinking of those poor souls at Halifax, who a few days ago had no thought of the coming catastrophe, and who now are in the throes of a storm, of misery, and desolation. They are on land, they, like those on Flanders' field, are victims of the Kaiser. But what about our sailors? Those mariners who watch by day and night? Were it not for our mariners every coast town of England and her allies would be like Halifax. How true then is this beautiful old song by Thomas Campbell. Let's read it over again, or hum the good old tune, and think of those who are at sea, every day, every hour this Christmas, guarding our shores, and the shores of our faithful Allies, guarding them as they never before had to be guarded.

Ye Mariners of England

Ye mariners of England
That guard our native seas,
Whose flag has braved, a thousand years,
The battle and the breeze!
Your glorious standard launch again
To match another foe:
And sweep through the deep,
While the stormy winds do blow;
While the battle rages loud and long,
And the story winds do blow.

The spirits of your fathers
Shall start from every wave–
For the deck it was their field of fame,
And ocean was their grave:
Where Blake and mighty Nelson fell
Your manly hearts shall glow,
As ye sweep through the deep,
While the stormy winds do blow;
While the battle rages loud and long,
And the stormy winds do blow.

Britannia needs no bulwarks,
No towers along the steep;
Her march is o'er the mountain waves,
Her home is on the deep.
With thunders from her native oak
She quells the floods below—
As they roar on the shore,
When the stormy winds do blow;
When the battle rages loud and long,
And the stormy winds do blow.

The meteor flag of England
Shall yet terrific burn,
Till danger's troubled night depart
And the star of peace return.
Then, then, ye ocean-warriors;
Our song and feast shall flow
To the fame of your name,
When the storm has ceased to blow;
When the fiery fight is heard no more,
And the storm has ceased to blow.

THOMAS CAMPBELL.

Let us all sincerely hope that ere another Christmas season comes around, we will be at peace with the world, or that we will at least be preparing for such a peace that at present "passeth all understanding."

Let us hope that instead of our "Mariners of England" having to guard our native shores as they are doing against such a merciless foe, that they will merely be policing the seas.

Wishing every reader of SANITARY ENGINEER as merry a Christmas as these troublous times will permit, and a prosperous New Year.

THE EDITOR.



Christmas Greetings

Montreal, Que., Dec. 15, 1917.

To the Members of the Canadian Society of Domestic Sanitary and Heating Engineers:

One year ago I addressed you one and all through the pages of SANITARY ENGINEER. *I felt somehow, or at least hoped that ere another Christmas had come round we would have peace. But it was not to be, we are still at war, our enemies are still at our throats. We have a few more friendly Allies who have come out in the open and are with us, standing for right against might, and just as with our Allies, so it is with those members of the craft who join us, and become our business Allies. They can see that we must be united for the common good of all*

Our Association exists for the purpose of righting wrongs. We are banded together to improve conditions to such an extent as will make for better relationship among the craft and our patrons, and I am glad to be in a position to say that we are succeeding, we are growing stronger in numbers. Our executive meetings have been fairly well attended, and to-day the outlook is brighter than ever.

And with these thoughts in mind I wish to greet you. I hope that every member will have as merry a Christmas and as happy a New Year as these warring times will permit, that ere another Christmas rolls round we shall have peace and our first after-the-war convention will also be a thing of the past.

Yours fraternally, *ALEX. CHARETTE, President.*

Toronto, Ont., Dec. 15, 1917.

To the Members of the Toronto Society of Domestic Sanitary and Heating Engineers:

Fellow Craftsmen,—I cannot express to you in words how deeply I feel at having to greet you again during war-times. It was my earnest hope that ere this this bloody war would have passed on away from us that we would have been engaged in trying to make world-wide amends.

We have sent our sons to fight on Flanders' fields, to consecrate their lives for freedom, so that this world may be a better place to live in Our Allies are more in number this Christmas than last, and they are allied with us to kill, that others may live.

So is the Toronto society banded together, and our members are more numerous. We are getting stronger, and intend to still fight on, that industrial peace may be ours.

The monthly meetings are being better attended. Members are adopting better methods of conducting their business and from a business outlook conditions were never more healthy.

But we must not slow down. We must keep on full steam ahead. Every member must feel that he has work to do for the benefit of all. It is only by so working that we can ever hope to establish that lasting peace when war shall be no more. With these few lines I will draw to a close, wishing you one and all, all you wish yourselves

Yours sincerely, *F H. GENTLE, President.*

Toronto, Ontario, Dec. 15, 1917.

To the Members of the Ontario Society of Domestic Sanitary and Heating Engineers:

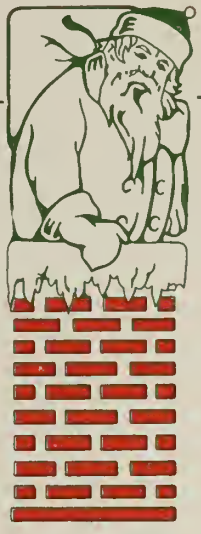
When last year I penned a few lines to you, I was filled with the sincere hope that this terrible war would have been over before another Christmastide had dawned upon us. But we are still at war We are in the throes of a terrible calamity such as was never recorded in history before. God grant that ere the close of another year, "peace on earth, goodwill towards men" will resound the world over.

It is with such aims in view that the Ontario Society exists. We desire peace in business. We aim at making conditions better for every member of the craft, to study the pros and cons of business that appear to be a hindrance to each other in conducting our daily undertakings.

It is, therefore, with no small amount of pleasure that I am able to report progress. Our membership is increasing, our meetings are being better attended; all of which will help in bringing to an end the petty ill-feeling that sometimes crops up in our midst And it is Christmas again. It is the closing of another year. Our fourth Christmas of war.

Let us hope and trust that the close of 1918 *will ring in lasting peace, and that every member of our society will enjoy just such a Yule-tide as seems most fitted to himself is the sincere wish of*

Yours very truly, *F. R. MAXWELL, President.*



HERE'S Christmas again, an Oasis of Good Cheer and Fellowship in a Desert of Hate and Uncharitableness.

To You All

Greetings

and Good Wishes

IN wishing you all the Compliments of the Season we express the hope that, despite unsettled conditions, you have had a Good Year.

WE trust, too, that Next Year will be even better, and that before it has continued long on its course, Peace will have come to us with Victory.

Canadian Wolverine Co., Limited

CHATHAM, ONTARIO

THREE FIFTY-DOLLAR BONDS FREE

WE ARE MAKING A NAME

What we consider to be the finest and most perfect laundry tub in the Dominion of Canada, and we want a name for it.

To three competitors who send in the best three names, we will award to each

A FIFTY-DOLLAR BOND

The only conditions are, that the competitor must be a master plumber or journeyman in the employ of a plumber and that the decision of the Canada Metal Co. be final.

The following special features that are embodied in the tubs will assist the competitor to arrive at a suitable name.



A TUB WITHOUT A NAME



LET US SEND YOU ONE

- Extra heavy, rust proof, zinc metal rim with solid soldered joints, thus eliminating any sharp, scratchy corners.
- Nickel plated strainers, with independent overflow, thus preventing tub filling above fixed height. This is a splendid improvement over old styles of tubs.
- Two nuts cast in back to fasten cover, or extension back on if required.
- Metal wringer guards moulded solid into ends as well as centre division.
- Round moulded corners, inside as well as outside.
- Outlets placed well away from centre division, and tub will drain itself dry.
- Neatly designed substantial legs.

Improved strength and quality from use of trap rock and best Portland cement, and will not absorb moisture.

THE CANADA METAL CO., Limited

TORONTO, CANADA

Hamilton Montreal Winnipeg Vancouver

WE HAVE EVERYTHING FOR THE PLUMBER



W. G. HARRIS, Senior President

Christmas Greetings 1917



W. G. HARRIS, Junior Vice-Pres.

FROM
THE METAL MEN

To our many friends and customers we extend our sincere wishes for : :

A Merry Xmas and Happy New Year

That ere another Christmas has dawned upon us, this dreadful war will have passed away.

THE CANADA METAL CO., Limited

TORONTO, CANADA

Hamilton Montreal Winnipeg Vancouver

WE HAVE EVERYTHING FOR THE PLUMBER



DESOLVO'S FIRST CANADIAN CHRISTMAS

Desolvo is now a full-fledged Canadian, made right here on Canadian soil in our factory at Toronto.

This "Canadian Desolvo" is the same successful pipe solvent that you have used with such good effect. It is the same cleaner that, mixed with cold water, generates intense heat and powerful gases that remove all pipe obstructions quickly and thoroughly.

It is the same Desolvo you have always used—exactly—only made in Canada. This is our first Christmas in Canada, and we like it fine. We hope you'll help us to like it even better during the coming year.

In the meantime ask us for a trial can of Desolvo.

Your jobber can supply.

Chamberlain Desolvo Co. Ltd.

Toronto

General Offices, Pittsburg, Pa.



Accept our Hearty Wishes
for
A Very
Merry Christmas
and
A Happy New Year



To you who have installed Mueller Fittings all year

A Merry Christmas

is assured. Yours is the satisfaction of knowing that every installation you have made is safe from complaint. You have sold your patrons the very best fittings obtainable.

Enjoy fully this festive season, and accept our sincerest appreciation for the business you have done with us.

We wish you a multiplied prosperity; and hope that the New Year about to dawn will bring to the world a lasting PEACE.

H. Mueller Manufacturing Co., Ltd.

SARNIA, CANADA



Greetings

IT IS our Sincere Wish that you and yours may this year enjoy a

Christmas "as usual"

and that the New Year may bring to you increased Prosperity and to all of us that Victorious Peace for which now we strive.

We thank you heartily for the good business of the Past Year and solicit. your esteemed patronage in the future



PORT HOPE SANITARY
MFG. CO., Limited
Montreal PORT HOPE Toronto

SANITARY ENGINEER

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EDWIN NEWSOME - - - - - - - - Editor

VOL. XI. DECEMBER 15, 1917 No. 24

WORKERS WANTED TO REBUILD DEVASTATED PART OF HALIFAX

COL. ROBERT LOW, head of the reconstruction committee, requests that all workmen, foremen, superintendents, timekeepers and other help who have been with him in the construction of different camps in Canada, report at once to Bate McMahon's office, 21 Central Chambers, Elgin Street, Ottawa, if they are prepared to come to Halifax on reconstruction work in connection with the rebuilding of the devastated area. SANITARY ENGINEER feels that every shop should try and release as many men as they possibly can to help in this work. No calling can add to the comfort, the health and general welfare of the citizens of Halifax as can sanitary and heating engineers. So it is to be hoped that a generous response to this call for assistance will result.

Halifax is just now our care. It is the place where war has placed its blight, and it should never be said that we did not "do our bit" for those our own war-stricken home folk.

HAVE YOU FIGURED RIGHT?

THE close of the year generally is that period when we are apt to look back over the lapse of time and consider all that it has borne for us. At the beginning of this year we all made certain resolutions; we all vowed to "mend our ways," some to a greater extent than others. How have we come out? Have we followed the plans we prepared a year ago? or have we gradually slipped back into the old beaten tracks of bygone days?

Well, if we have, we have been at least human, for it does somehow appear to be "human to err," which means that we must brace up and cast aside the apparently human element in ourselves, and call a halt. Resolutions are to be commended, but we should keep them dotted down on a daily pad. We should look them up every day and not file them too hurriedly as is too often the case. Filing our resolutions too soon is the reason we too often forget them. We forget to figure them out right and thus we fail.

Now, how must we find out as to whether we have figured right or not? Simply by changing our viewpoint in relation with ourselves, by forgetting we are ourselves and by taking an inventory of our stock as if it were belonging to the other fellow. Then we must place ourselves in the position of a possible purchaser, build no castles in the air, but keep right down on rock bottom.

Next, we must open a stock account and charge that stock against our business, not in favor of it, but making every move in our business responsible for the stock and making sure also that the selling price of the stock shall include every item of cost. This can only be done by adopting some well tried and found-true method. So by all means make sure, and ask yourself if you have figured right. Your stock, your accounts payable and receivable and your bank balance will tell you that. Make sure that, even though you have not figured right, you know it, and also know how to start right next year, and last, but not least, make all the resolutions you like, but don't file them away for future reference, refer to them every day.

CAST IRON VERSUS WROUGHT FOR SOIL, WASTE AND DRAINAGE

ON another page there appears a list of buildings erected in Winnipeg within the last ten or fifteen years that have had wrought iron pipe installed for soil, waste and drainage systems as well as some of the most prominent buildings for which cast iron soil pipe has been chosen.

We hope our readers will take particular note of this list because we have good reasons to believe that the plumbing in some of those buildings in which wrought iron pipe is installed, galvanized or otherwise, will have to be torn out, and the article in question will come in handy for reference.

We have good reasons too to believe that in spite of the expert advice given to the Public Works Dept. at Ottawa, both by personal calls and by correspondence, those men at the head of the building commission still appear to be in favor of using galvanized wrought iron pipe. But if such material is used as specified for the new Parliament Buildings, the readers of SANITARY ENGINEER will be taken behind the scenes and will be shown that those in authority are side tracking the issue and that they are being used as a cat's paw by certain interests. SANITARY ENGINEER has the proofs in black and white. But we would much rather be in a position to say that good, sound, and irrefutable advice had been at last heeded, and that the right material for the proper purpose was being used. We are still hoping, even though our hopes may be in vain.

ARE you planning to place your business on a Strictly Cash Basis? When the country is prosperous is a far better time to inaugurate such a movement than in times of depression. A good New Year's resolution would be "Strictly Cash."

PRACTICAL SHEET-METAL WORK

THREE PIECE ELBOW WITH GUSSET OR GORE PIECE.

BY THOMAS STANFIELD

ONE of the chief troubles with most furnaces, no matter of what kind, is very often traced to poor chimneys. Sometimes they are not properly built, not large enough or have some obstruction at or near the roof.

Many times it has been found that a taller building has been erected possibly after the furnace has been in operation, or it may be that the taller structure was first built.

The chimney top here described and for which patterns are to be developed has proved very satisfactory. The first the writer constructed was required owing to the fact that a tall building was built nearby after the furnace had been in operation for several years, and up to that time had given splendid service But when the taller building was erected trouble began.

Since then several of the tops described have been fitted up to existing chimneys, and have resulted in a great improvement.

The principle of this chimney top is that when a wind blows even against the taller building the draft is forced through the pipes A.A. either up or down and in any case this draft causes a suction on horizontal pipe B, and prevents a down draft. As to size the pipes should all be the same diameter.

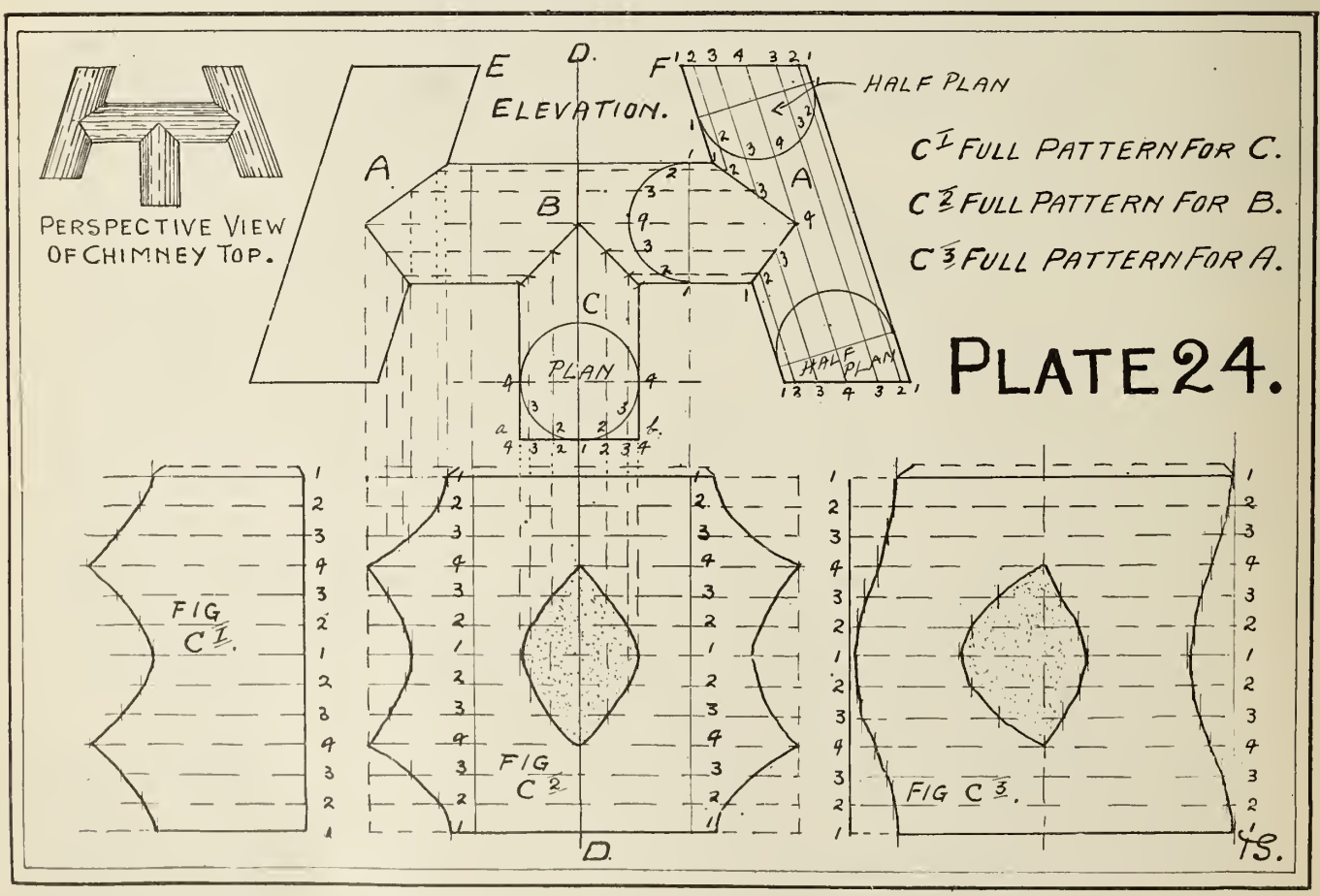
In developing the patterns, the elevation and plan is first drawn as shown. Pipe C enters the chimney and may be fitted to a square to round piece which should not have less cubic contents than C.

Next divide plans of each pipe as shown into twelve equal parts, using only the four figures 1, 2, 3, 4, and repeating same. Next draw a vertical line DD, through centre of pipe C and B, which should be the true centre of the elevation. Now determine the diameter of chimney top. The length of pipes AA should never be less than three times their diameter, four times is preferable, and the distance between point E F should never be less than the proportions shown, say one and seven-eighths of the diameter with a pitch of about 60 degrees.

It will be noted that as all pipes are equal in diameter the eight mitres are all in the centre of each pipe, therefore, it would be well to centre each pipe. draw three half plans of A and B and full plan of C, then draw the mitres.

Next draw dotted lines through the half and full plans at points 1, 2, 3, 4,

(Continued on page 30.)



Market Conditions and Tendencies

Statements Regarding the Prices and Trend of Supplies.

THE MARKETS AT A GLANCE

INTEREST during the time since last issue has largely centred around the decline in lead pipe, lead waste pipe and traps and bends. Solder has been in firmer market with advances recorded in some quarters. This latter situation has been induced through the situation in ingot tin. Stocks of ingot tin in Canada are light and the British Government is issuing permits for shipment from her ports very sparingly. The United States Government has been endeavoring to get some supplies through but as yet has not met with very much success. Negotiations are still under way. Lead has been holding in a steady position for some time past. It is reported that the United States Government is likely to fix the price for this commodity in the near future but it is expected by those closely in touch with the situation that there will be no radical change even when there is a fixed price. Spelter gave evidence of some weakness during the week. Pig iron production is being hampered through the shortage of coke supplies. Canadian producers are still quoting on the basis of delivery in nearby months. There was a further settling toward lower levels on galvanized and black sheets. Wrought iron pipe held in a stationary position. Business in plumbing lines is not heavy, but there is nothing unusual in this situation for this season of the year.

TORONTO, Dec. 13.—At the present time there is the usual lull in business pertaining to the plumbing trade which is characteristic of this season of the year. It is a little early yet to get a definite line on what is likely to happen in the building trades next year. But manufacturers and dealers in supplies of various kinds are hopeful that something definite may develop by way of information that will give some clue to building operations that are likely to be carried out next year. The fact that very little building has been going on for the past three years seems to indicate that more will have to take place this coming year. Of course, speculations in this respect may be wide of the mark.

Heavier Sheets For Boilers Restricted

RANGE BOILERS.—Manufacturers of range boilers are concerned over the fact that there has been no disposition to raise the embargo on heavy sheets coming into Canada from the United States. These sheets of No. 10 gauge an dheavier were of the kind used in the construction of the ends for range boilers. Demand for range boilers is normal at this time of the year, but should it develop strength for delivery next spring the manufacturers will perhaps find themselves in a quandary to meet their requirements for the heavy sheets. About the only way out of the difficulty would be to use a lighter sheet and reinforce it. No definite developments along this line have as yet taken place. Prices remained unchanged since last issue.

	Standard	Extra Heavy
30-gallon range boilers....	$13.00	$17.00
35-gallon	17.00	20.50
40-gallon	20.50	24.00
52-gallon	28.00	32.00

Enamelware Demand Normal for Season

ENAMELWARE.—The demand for enamelware is normal for this season of the year, and is mostly confined to small orders. Until there is some indication that building operations will be undertaken in the coming year there will in all probability continue to be a light demand for enamelware. Prices held unchanged during the week.

Bath-tubs, roll rim, 4, 4½, 5 feet, 24 to 30 in. wide	$32 10
Bath-tubs, 5½ ft.	35 70
Sinks, roll rim, 18 x 30 in., staple.....	16 80
Closets, oak tank and seat	22 00
Do., enamel iron or white vitro tank...	23 75

Steel Pipe Makers Are Kept Fairly Busy

WROUGHT PIPE.—While the demand for pipe is not heavy at this season of the year manufacturers are kept fairly busy with the volume of work now before them. They have been working on contracts that should have been filled some time ago but owing to the difficulties in getting raw materials and the shortage of labor have been restricted in their output. Conditions so far as getting raw materials are concerned show improvement over recent months and this is facilitating their operations. Prices held unchanged.

WROUGHT IRON PIPE PRICES

Effective July 5, 1917.

Standard Buttweld.

	Black	Galvanized
	Per 100 feet	
⅛ in.	$ 5 00	$ 6 50
¼ in.	5 12	7 16
⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 94
3½ in.	69 92	86 94
4 in.	82 84	103 00
Standard Lapweld.		
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10L in.	256 00	320 00
10 in.	329 60	412 00

WROUGHT NIPPLES.

4" and under, 45%.
4" and under, running thread, 25%.
4½" and larger, 40%.

STANDARD COUPLINGS.

4" and under, 35%.
4½" and larger, 15%.

Prices—Ontario, Quebec, Maritime Provinces.

Between Seasons for Soil Pipe Supplies

SOIL PIPE, FITTINGS.—This is the between-season period for building operations and the demand for soil pipe and other commodities is naturally quiet. The market held unchanged from the quotations recently given.

SOIL PIPE FITTINGS.

Medium and extra heavy soil pipe, 6-inch and under	35%	2½%
8-inch soil pipe	....	30%
Medium and extra heavy fittings, and under	40%	2½%

C. I. PIPE FITTINGS.

Cast iron fittings	....	15%
Cast elbows, tees, etc.	....	15%
Plugs	....	30%
Bushings	30%	33%
Flange unions, standard	....	20%
Dart unions, ¼-inch to 2-inch.....	20%	25%
Do., 4½ in. and larger	....	15%
Nipples, up to 4-inch	....	45%
Do., 4½-inch and larger	....	40%
Do., running thread 4-in. and under	....	25%
Couplings, 4-in. and under	....	35%
Do., 4½ in. and larger	....	15%

MALLEABLE FITTINGS.

	Black	Galv.
Malleable Fittings, Class A, lb.....	0 50	0 63
Do., Class B, lb. net.....	0 22	0 33
Do., Class C, lb. net.....	0 15	0 22

Valves Continue To Be Active Feature Line

VALVES.—Activities of plumbing supply houses continued to centre around

valves, especially so for the manufacturers. There is no cessation in the amount of business which they have been called upon to handle, all of which is cause for gratification. This work will keep the plants running at a time when demand for other plumbing supplies is light. One of the lines of valves manufactured in the United States and distributed in Canada has been subject to a revision in price in the upward direction.

	Discount off list
Ground work	50
Compression work, standard	52
High grade	45
Cushion work	46
Fuller work, standard	50
High grade	43
Basin cocks, No. 0 standard	46
Nos. 1 and 2	46
Bath cocks	53
Flatway stop and waste cocks, standard.	53
High grade	50
Roundway stop and waste cocks, standard	53
High grade	50
Brass steam cocks, standard	Net
Globe, angle and check valves, standard.	10
High grade	7½
Radiator valves, standard	15
High grade	10
Patent quick opening valves	35
Basin Cocks—	
No. 0 and 1, Fuller pattern	50
No. 0 and 1, compression	46
Midget	50
Globe, angle and check valves, medium pressure	30
Radiator valves, standard	30
Radiator valves, Jenkins disc	30
Radiator valves, quick opening	40

Oakum Market Shares Quietness of Other Lines

OAKUM.—The oakum market is sharing the quietness of a number of other plumbing lines at this season of the year. Prices held unchanged. In bale lots plumbers' spun oakum continued to be quoted at $8.50 to $10 per 100 lbs., with slightly higher prices for less than bale lots.

		Per 100 lbs.
Best American	....	$21.50
U.S. Navy unspun	....	20.75
Plumbers' spun	$8.50	10.00

Copper Bars And Brass Bars Go Lower

COPPER BARS, BRASS BARS.—Lower quotations on copper brass, brass bars, copper sheets and brass sheets were made in certain quarters during the week. Copper bars, ½-inch to 2-inch, in full lengths, were quoted down 5c per pound at 43c per pound. Plain copper sheets of 16-oz. base and heavier were quoted down 2c per pound, making the quotation 46c. Brass spring sheets, 24-gauge and heavier, were down 5c per pound, and were quoted at 43c. Brass rods, ½-inch to 1-inch, were quoted at 39c per pound, making the range of prices 39c to 40c. The possibility of getting lower-priced copper by the domestic consuming trade in the United States has had a weakening effect on the market.

Cement Market Gives Indication Of Firmness

CEMENT.—There is a firmness in the market for cement, which seems to indicate the possibility of higher prices. Cost of manufacture has been increased through the fuel situation and labor situation. In carload lots cement is quoted at $2.40 per barrel, and in small lots at $3 per barrel. There is a fairly good demand for cement at the present time in the finishing of buildings and in sewer work. Demand in this respect has been up to a normal month at this season of the year. Those closely in touch with the situation intimate that there is strong probability of a change in price in the near future.

New Discount On Torches Increases Price

TORCHES, SCREWDRIVERS.—By a change in the discount on the Clayton & Lambert torches an increase in the price is provided for. Where formerly the discount was 12½ per cent. it is now 5 per cent. off list. Blue line screwdrivers have made an advance of approximately 10 per cent. No. 670 by 4 inch being quoted at $3.50 per dozen and No. 670 by 6 inch at $4.50 per dozen net.

Competition Sends Sheets Still Lower

SHEETS, PLATES.—Owing to the desire for business and to the fact that there are fairly good supplies of the lighter gauges of black sheets in the local market there was a movement toward lower levels in one quarter during the week, the reduction amounting to 50c per hundred pounds. In the instance quoted the following prices now prevail on black sheets: No. 12, $7.55; No. 14, $7.45; No. 16, $7.50; Nos. 18-20, $7.30; Nos. 22-24, $7.35; No. 26, $7.40; No. 28, $7.50; No. 29, $7.60. Lower prices have also been made effective in Apollo brand galvanized sheets as follows: 10¾-oz., $9.80; No. 28 gauge, $9.50; No. 26 gauge, $9.20; Nos. 22 and 24, $9.05; Nos. 18 and 20, $8.90; No. 16, $8.75; No. 14, $8.65. Shipments of lighter gauges of black sheets have been fairly good from the United States producers.

		Per 100 lbs.	
BLACK SHEETS—			
10 gauge	$	$12 00	$12 00
12 gauge	7 65	11 60	11 60
14 gauge	7 45	9 90	11 65
16 gauge	7 50	10 00	11 75
18-20 gauge	7 30	8 80	10 80
22-24 gauge	7 35	8 85	10 85
26 gauge	7 40	8 90	10 85
28 gauge	7 50	9 00	11 00
3-16-inch plate	12 25	....	.....
¼-inch boiler plate	12 00	....	.....
GALVANIZED SHEETS—			
10¾ oz.	$ 9 80	$10 00	$12 00
U.S. 28	9 50	9 70	11 70
U.S. 26	9 20	9 40	11 40
22 and 24	9 05	9 25	11 25
18 and 20	8 90	9 10	11 10
16	8 75	8 95	10 95
14	8 65	8 85	10 85

Former Prices On Corrugated Sheets Restored

CORRUGATED SHEETS.—Manufacturers of corrugated sheets have returned to the previous level on corrugated sheets, following an advance of 30c on No. 28 gauge and 40c on No. 26 gauge, which was made effective last week and lasted for a few days only. No. 28 gauge is now quoted at $8.70 per 100 square feet and No. 26 gauge at $9.60. The statement was made by one dealer that since the advance made was slight on second consideration it was deemed advisable to adhere to former prices rather than disarrange the market by a new set of prices. Conductor pipe and eavetrough, however, hold steady at the advance recorded of approximately 10 per cent. which now makes the selling price net list.

	Per 100 Sq. Feet Galvanized	Painted
No. 28 gauge	$ 8 70-$ 9 00	$ 8 00
No. 26 gauge	9 60- 10 00	9 25
No. 24 gauge	15 00-	12 00
No. 22 gauge	18 00-	15 25
No. 20 gauge	21 00-	18 50
No. 18 gauge	27 00-	24 00

Lead Pipe, Traps and Bends Decline: Solder Up

LEAD AND ZINC PRODUCTS.—A decline of 1c per pound was recorded in the price of lead pipe and lead waste pipe, making the selling price of the former 14c per pound and the latter 15c per pound. Lead traps and bends have declined approximately 10 per cent. and are now quoted at net list, the former price being 10 per cent. on list. Owing to the situation in tin a further advance in solder has been made effective during the week. Guaranteed solder has advanced 1½c per pound, and is now quoted at 42½c. Strictly half-and-half is quoted at 39½c, an advance of 1¼c. Commercial solder has been advanced 1c per pound to 36¼c, while wiping solder has been advanced ½c, and is now selling at 38½c. Lead sheets and lead pipe held steady in price during the week.

Lead pipe, lb.	0 14	....
Lead waste pipe, lb.	0 15	....
Lead traps and bends	Net list	
Lead wool, lb.	0 16	
Lead sheets, 3 to 3½ lbs. sq. ft., lb.	0 13¼	
Lead sheets, 4 to 8 lbs. sq. ft.	0 12½	
Cut sheets, ¾c extra, and cut sheets to size, 1c lb. extra.		
Solder, guaranteed, lb.	0 42½	....
Solder, strictly, lb.	0 39½	....
Solder, commercial, lb.	0 36¼	....
Solder, wiping, lb.	0 38½	....
Solder, wire, lb.	0 45	....
Zinc sheets, per lb.	0 26	....

Boiler Tubes Go To Australia And Japan

BOILER TUBES.—A Toronto dealer states that a carload of boiler tubes has been sold to Australian buyers and another carload to Japanese buyers. Stocks of these tubes were reasonably good at the time of sale, and the transaction was permitted to be carried through only because these tubes had been in warehouse here before the recent order prohibiting sale except under special permit in each instance. These sales have accordingly reduced the available stocks for Canadian trade by this amount. Prices held unchanged during the week.

Toronto—	Per 100 feet Cold drawn	Lapweld
1 inch	$36 00	$ ....
1¼ inch	40 00	....
1½ inch	43 00	36 00
1¾ inch	43 00	36 00
2 inch	50 00	36 00
2¼ inch	53 00	38 50
2½ inch	55 00	42 00
3 inch	64 00	50 00
3¼ inch	....	58 00
3½ inch	77 00	60 00
4 inch	90 00	75 00

Tea Lead and Heavy Lead Pipe Up ½c

OLD MATERIALS.—An advance of ½c per pound was recorded in the price being paid by wholesalers for tea lead, making the quotation now 4½c per

(Continued on page 32.)



PERSONAL

Mr. George S. Newill, of the staff of Laurie & Lamb, engineers, has accepted a position with the Dominion Bridge Co., Lachine, Que.

Mr. W. Clement Munn of Munn & Shea, Montreal, has been selected as Liberal candidate for the Montreal division of St. Lawrence—St. George.

J. J. W. Campbell has applied for the position of city engineer of St. John, N.B. This office was recently left vacant through the death of Mr. Murdock.

Capt. A. J. Latornell, formerly city engineer of Edmonton, is reported wounded in action. His home is at Meaford, Ont., and he went overseas as a lieutenant in a battery from Cobourg.

C. J. Bromley, who for the past four years has been in charge of the water and public works department of Grimsby, Ont., has been elected a member of the Institute of Municipal Engineers of Great Britain.

Mr. G. R. MacLeod, head of the sewers department of the city of Montreal has joined the Imperial Munitions Board, having accepted a position in their organization now being established at Washington, D.C. The city of Montreal has given him indefinite leave of absence.

FIRE LOSS

Paris, Ont.—Manufacturing plant owned by Ontario Gypsum Company has been destroyed by fire at a loss of $50,000. Owners will rebuild.

CONTRACTS AWARDED

Hamilton.—H. Langford has the plumbing contract for the Roumanian Church here.

St. John, N.B.—G. & E. Blake have the plumbing and heating contract for a $150,000 Girls' High School.

Brantford, Ont.—Anguish & Whitfield have the plumbing contracts for alterations costing $8,000 to the factory of the Kitchen Overall and Shirt Company.

Maissonneuve.—George Suprenant has the plumbing and heating contract for $20,000 shoe factory for the Lida Shoe Co.

Montreal.—Paquette & Fortin have plumbing contract for factory of Holland Varnish Company.

Peterboro.—George A. Brenton has plumbing contract for $500,000 plant for the Quaker Oats Company.

Three Rivers, Que.—Germain & Freres have plumbing contract for $60,000 box factory for the Three Rivers Box Co.

INCORPORATIONS

Windsor, Ont.—Thompson Bros. has been incorporated with a capital of $60,000 to manufacture and deal in brick tiles, drain and sewer pipe of all kinds made from clay, cement, stone or other products. Wm. Thompson, H. A. Thompson and L. H. Wiers are directors of the new company.

Walkerville, Ont. — Walkerville Brick and Tile Company has been incorporated with a capital of $40,000 to manufacture and deal in brick and tile drain and sewer pipe.

Windsor, Ont.—Thompson Brothers, Ltd., capital $60,000, to carry on business of dealers and manufacturers of brick, tiles, drain and sewer pipes, general contractors, etc.

WORKS CONTEMPLATED

Fort William.—City Council contemplate construction of water-main tunnels.

Chatham.—City Council contemplate enlargement of water basin.

Wallaceburg.—Town Council contemplate waterworks improvements.

TENDERS

Toronto.—Tenders are being called for the construction of a drainage system for the Don Bridge Bloor St. Viaduct for the Board of Control.

Winnipeg.—Tenders were recently called by the commissioners of the Greater Winnipeg Water District for the following contracts: Construction of pressure pipe line from Red River to McPhillips St. reservoir; manufacture and supply of 48-inch pre-moulded reinforced concrete pressure pipe; supply of cast iron pipe and specials.

CONTRACTS GRANTED

Toronto.—The Dominion Sewer Pipe Company of Swansea has been awarded by the Board of Control the contract for the ensuing year's supply of sewer pipe. The National Iron Works will supply the cast iron pipe.

ENLARGE SEDIMENT BASIN

Some trouble has been experienced with the purification of the water supply of Chatham, Ont. To remedy conditions, it is suggested that the sedimentation basin at the water-works plant be enlarged to three times its present capacity.

WORKS CONTEMPLATED

Chatham, Ont.—The city council contemplates the construction of a drainage system on Pine Street.

Chatham, Ont.—The city council contemplates the construction of a glazed tile sewer on Park Ave.

ELECTION OF OFFICERS FOR TORONTO SOCIETY

The Toronto Society of Domestic Sanitary and Heating Engineers will hold their regular monthly meeting for December on Wednesday, the 19th, at 8 p.m., in the Canadian Foresters' Hall, 22 College Street, when the election of officers and committees for 1918 will take place.

ACQUIRED A PRIVATE HOTEL

W. C. Schultz has purchased that property known to Torontonians as Isabella Private Hotel, corner of Isabella and Sherbourne St.

He is very busy in his plumbing and heating business, and expects as soon as the work on hand is finished to take an active interest in the comforts of the patrons of his newly acquired property.

POST FOR RETURNED SOLDIER

Brantford, Ont.—The board of works has appointed George Broomfield, a returned soldier, to the position of plumbing inspector, recently vacated by order of the city council following a lengthy investigation.

TRADE GOSSIP

Toronto, Ont.—A. Welch & Son have the plumbing contract for $80,000 warehouse for Davis & Mahr, Union Bank Bldg.

Newcastle, N.B.,—Fred Uncles, Newcastle, has the plumbing contract for $10,000 automobile warehouse for Lounsbury Company, Ltd.

Moncton, N.B.—William Crowley has the plumbing and heating contract for stores and residences, costing $7,000, for C. S. Clarke, Empire Block.

Moncton, N.B.—Sumner & Co., 635 Main St., have the plumbing and heating contracts for $150,000 glass factory for Humphrey's Glass Works, Trenton, N.S.

Toronto, Ont.—Purdy, Mansell, Ltd., have the plumbing contract in connection with the erection of a $90,000 school annex on Perth Ave. for the Board of Education.

Brantford, Ont.—T. J. Minnes & Co., 9 King St., have the heating contract for alterations, costing $8,000, to factory for the Kitchen Overall and Shirt Company.

Quebec, Que.— Giguere & Frere, plumbers, electricians, etc., have registered.

MEETING OF CREDIT ASSOCIATION

Winnipeg, Man.—A meeting of the wholesale section of the Canadian Credit Men's Association was recently held when a conference upon matters pertaining to wholesale business took place with representatives of the government.

COMPANY DISSOLVED

Montreal, Que. — Sclater Asbestos Company has dissolved, Mrs. Wm. Sclater continuing under same style.

HARDWARE MERCHANTS OPEN PLUMBING DEPARTMENT

The L. P. Barber Co. of 879 St. Catherine St., Montreal, have a plumbing department and a gang of four men and two boys. They have found the department an advantage to the hardware end of the business and do some contract work but mostly repairs, etc. Have about 700 customers on their books altogether. Have not found the addition of the plumbing department to be a big factor in increasing their overhead charges. They found some space available in their premises and at moderate cost closed part of this in and used it for the plumbing department. The only cost was that of the material necessary to enclose this.

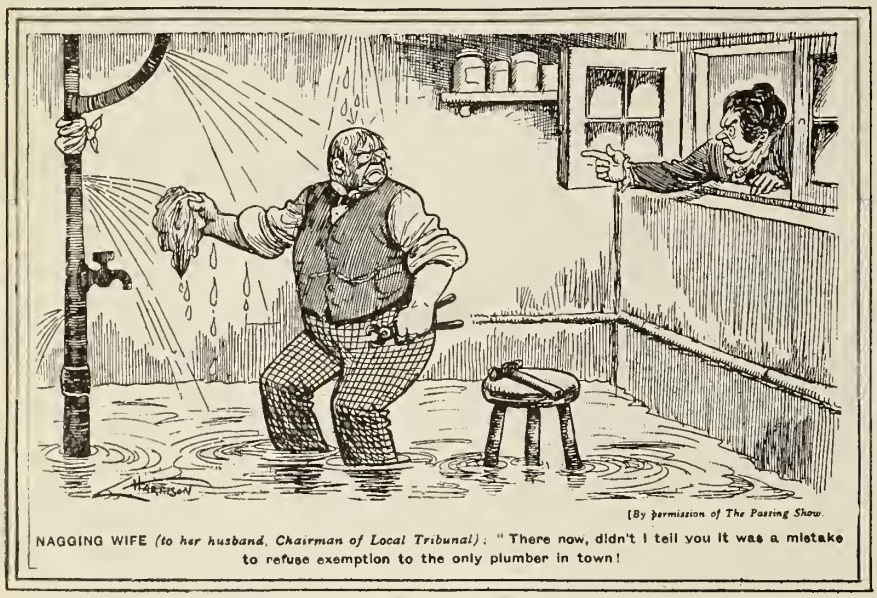
ST. THOMAS STORM SEWERS

St. Thomas, Ont.—The cost of the proposed storm sewage system for this city has been estimated at $64,064 according to a report of City Engineer Ferguson and Consulting Engineer Bell. The city is divided into five sections and a special sum allotted to each. The expense of excavation is placed at $28,609; pipe, $9,731; catch basins, $7,150; manholes, $5,250. Total $50,740. Extras, 10 per cent., $5,074 and interest at 5½ per cent., $8,250.

It is possible that the matter may be submitted to the people at the coming municipal election. It has been suggested that owing to the high cost of labor and material and owing to the condition of the money market, the matter should be held in abeyance. Some parts of the city which are in dire need of storm sewers may be reached without calling for the expenditure of the entire estimate.

MORE POWER FOR SASKATCHEWAN TRADESMEN

Representatives of Saskatchewan merchant tradesmen recently waited upon members of the law amendments committee of the Saskatchewan Legislature with a request for more latitude for the creditor in the small debts court, the giving of power to local J.P.'s to have debtors brought before them and be examined for discovery, the increasing of the provincial fee for hawkers and pedlars, and statutory power being given to cities and towns to declare a half holiday each week during certain of the summer months. In dealing with the first request it was outlined that the merchant tradesmen should be given the privilege of obtaining executions for a sum smaller than $50, the amount now settled in the small debts court. The merchants' deputation consisted of Messrs. Polson, Hutchinson and Raymond. A fee of $200 was suggested as a fair provincial taxation on hawkers and pedlars.



(By permission of The Passing Show.

NAGGING WIFE *(to her husband, Chairman of Local Tribunal)*: "There now, didn't I tell you it was a mistake to refuse exemption to the only plumber in town!

Reprinted from the Plumbing Trade Journal, England.

The above gives one some idea of the conditions in the Old Country. But who can tell how soon they may be the same in Canada and the United States? Kaiser Bill has undoubtedly something to answer for.

"PARTICULAR PLUMBING PAYS"

W. W. McDonald, sanitary engineer of Sackville, N.B., has the right idea about his local newspaper advertising and realizes that "Particular Advertising Pays" as well as the plumbing.

A recent ad in a Sackville newspaper, the basis of which might well be adopted by other merchant plumbers in the country, reads as follows:

"Something to Cause Serious Thinking"

"Do you know that many of the bath rooms installed in this town have a very unpleasant smell?

"This unpleasant smell is nothing less than the dreaded SEWER GAS which has caused all kinds of deaths and sickness. Think of all the trouble and expense you are put to when sickness, caused by this sewer gas, takes a grip on your children.

"Have your plumbing done right."

CANADA'S TRADE GROWS RAPIDLY

An increase of approximately $273,000,000 for the first seven months of the fiscal year ending with October, as compared with a similar period last year, is shown in the trade statement for October, just issued. For the seven months the trade in the Dominion totalled $1,586,616,258, as compared with $1,313,189,951 last year. For the month of October alone, Canada's trade amounted to $238,834,321. In October, 1916, it aggregated $164,330,179.

Exports of domestic goods for the seven months were to the value of $992,195,134, as compared with $622,049,481 last year. These figures include coin and bullion. Imports for the seven-month period amounted to $636,749,263. During the seven-month period last year imports aggregated $483,132,928. Dutiable goods were to the value of $346,108,703, on which the customs collections amounted to $102,106,365. Free goods imported were to the value of $281,992,997. During the same period in 1916, dutiable goods worth $204,530,818 were brought into Canada, and $82,177,312 was collected in customs duties. Free goods importations were valued at $207,630,667.

Manufactured goods to the value of $420,380,372 were exported, a big increase as compared with last year, when domestic manufactures to the value of $219,461,054 were shipped out of the country.

PRACTICAL SHEET METAL WORK

(Continued from page 26)

3, 2, 1. Cutting each mitre as shown, all lines of which must be parallel with the outlines of the elevation.

Next draw a vertical line as shown in Fig. C^1 and divide it off into twelve equal parts 1, 2, 3, 4, 3, etc., from these points draw as many horizontal lines. Next take the compass and transfer the measurements from line a b in pipe C, and mitre, C, B, to the stretchout line, Fig. C^1, cutting each of the dotted lines which bear their corresponding figures. By connecting these points the pattern for pipe C is developed.

The pattern for Figs. C^2 and C^3 are developed in a similar manner, as also are the holes in the various patterns. The one stretchout line can be used as in the case of Fig. C^1. Allowance must be made for joining the mitres, but the pattern of the hole is well to be cut a little small at first, because it can always be fitted, whereas if cut too large there is nothing but making up another piece that will do. The joints of such a top must always be tight so as to make it as effective as possible.



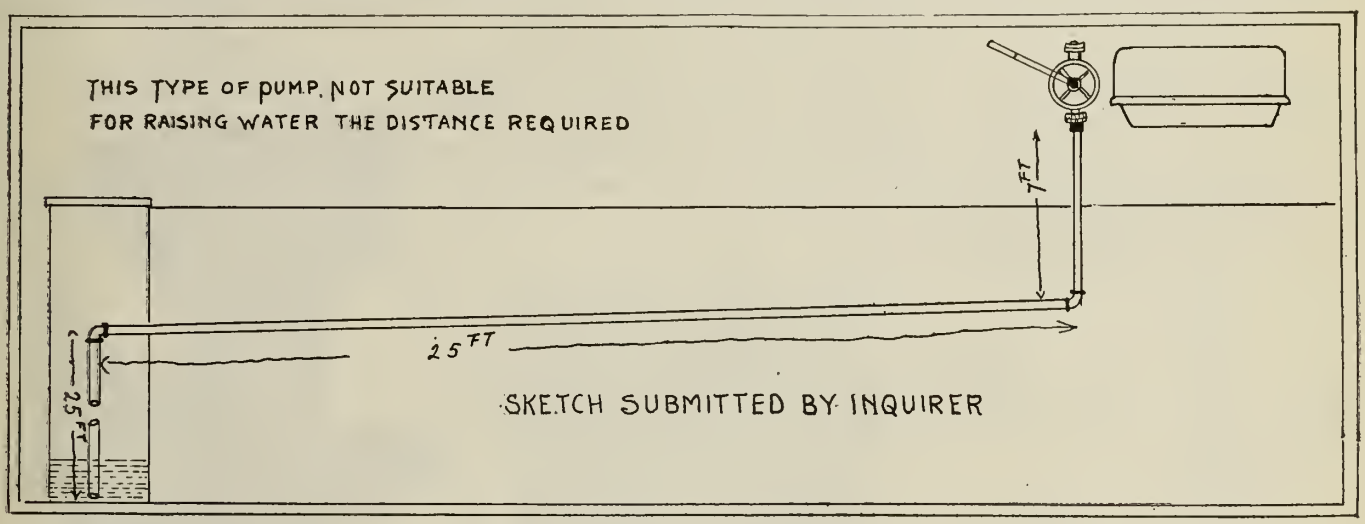
Subscribers Are Urged to Send in Questions to be Answered, or to Comment on Letters Published—Description of Jobs Done or Shop Kinks Are Also Invited.

Pump Will Not Lift Water

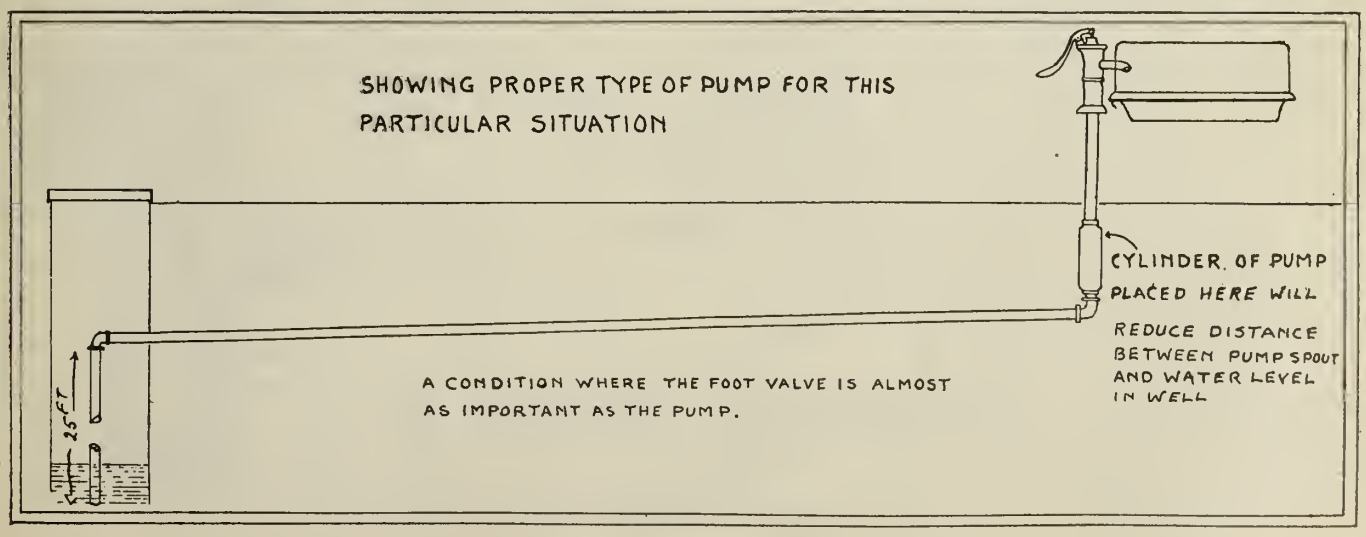
Editor SANITARY ENGINEER. — I am having trouble with a pump I installed recently and have sent you a sketch showing how it is fitted up.

It is a semi-rotary pump and is fastened to wall near sink in kitchen. Would you please let me know what I must do to overcome any fault you may find in the job so I can get water. Maybe the pump I have is not the right kind. An early reply will oblige as we have no water in the kitchen. I want to use the same piping even if I must change the pump.

I may say that I was a resident of Toronto and working at the trade so have had considerable experience in pump installations and have now moved to my present address.—Country Town Plumber.



It will be seen by sketch (Fig. 1) and the measurements shown, that the pump is too far away from the water. In the first place the pump will have to be changed, and one with a cylinder procured. If the vertical pipe is taken out and a cylinder pump is procured, the cylinder can be fitted near to the elbow where the suction pipe turns from the vertical to horizontal, so as to reduce the distance which the pump must draw the water. No pump will lift water more than 33 feet. See Fig. II. Then a reliable foot valve should be placed on the end of suc-



tion pipe in well. Many men in the trade have and hold the opinion that any old thing will do for a foot valve. Such an idea is far from practical. The foot valve is one of the most important parts in a water supply system, no matter whether it be a large or small one, power or hand-driven.

THE RELATION OF AIR TO THE DETERIORATION OF PIPE

(Continued frome page 12)

with air excluded that I will in another article show many other reasons why the air should be excluded as much as possible from all piping in this climate, and I hope in the very near future to be able to give you details of an absolutely new system of plumbing which provides for no circulation of air through the piping, but for all traps to be properly vented and where no sewer air can possibly enter the house.

Yours very truly,
R. N. Murphy,
351 Lisgar Street.

MARKET CONDITIONS AND TENDENCIES

(Continued from page 28.)

pound. Heavy lead pipe advanced a similar amount and is now quoted at 6c per pound. Automobile tires on the other hand were down ¼c, quotations being made at 4¼c per pound. Prices on other old materials held unchanged. Mills are buying in very light quantities, seeking only what they need for their immediate requirements.

Tea lead	$ 0 01½	....
Heavy lead pipe	0 06	....
Yellow brass	0 12	0 13
Red brass	0 20	....
Light brass	0 09	....
Heavy zinc	0 05½	0 06
Heavy copper	0 20	0 21
Stove plate, per ton	17 00	18 00

Tin Continues In Active Market

INGOT METALS.—Tin continued to be the centre of interest during the week. Canadian tin is still quoted lower than on the New York market. Interest in copper is beginning to revive owing to a conference held in Washington on Friday between the copper producers and the War Industries Board. Business in ingot metals is reported fairly good.

COPPER.—Producers of copper have started to make assertions that the established price of 23.50c is not in conformity with the productive cost at the time of the making of the price. It was pointed out at the conference in Washington that labor troubles at the mines have added greatly to the cost. The general impression is, however, that the Federal Trade Commission believes that the original price fixed by the Government was higher than the facts warranted. In the local market the prices ranged from 30c to 32c for casting copper.

TIN.—There is active interest in tin in the local market and prices were firmly maintained at the quotations of last week. In one instance where quotations were made on a basis of 75c to 80c per pound the range was narrowed to 77c to 80c. One large dealer continued to quote on the same basis as last week. In the primary market in New York quotations as high as 86c per pound have been made on Straits tin.

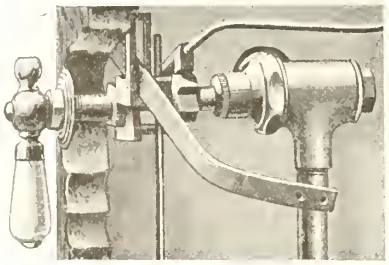
SPELTER.—There was an easier trend to the local market in certain quarters and prices were quoted ¼c under the low quotations of last week, making the range from 9¾c to 10½c per pound. The question of spelter prices is to come up for discussion at Washington in the near future.

LEAD.—There was a quiet market locally for lead, with demand fair. Prices held unchanged at a range of 8¾c to 9c per pound. Fixation of a maximum price by the United States Government is an item that is scheduled for discussion in the near future.

ANTIMONY.—While some concerns continued to quote at a range of 16c to 18c per pound, one concern gave a firm quotation of 18c per pound. Business in this metal is not heavy at the present time. In the primary market dullness was manifested.

ALUMINUM.—Quotations held unchanged at 60c per pound. Interest in this commodity is not very keen at the present time. Prices in the United States market held unchanged during the week.

PIG IRON.—Smelters of foundry iron continue to make sales for delivery in nearby weeks on the basis of $50 per ton. The coke situation is giving considerable concern. Canadian smelters are piecing out their supplies of coke by the use of materials that have not been thoroughly seasoned.



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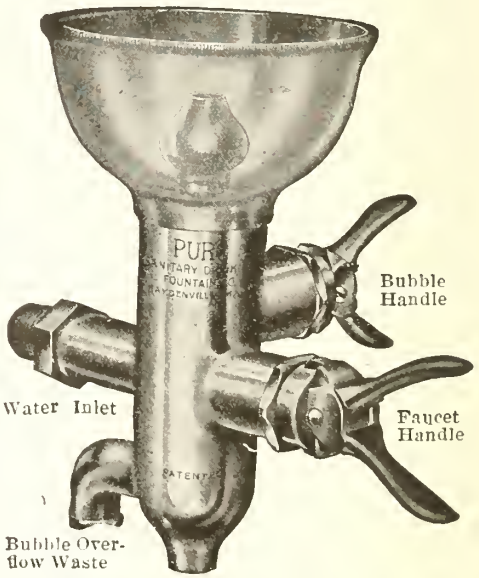
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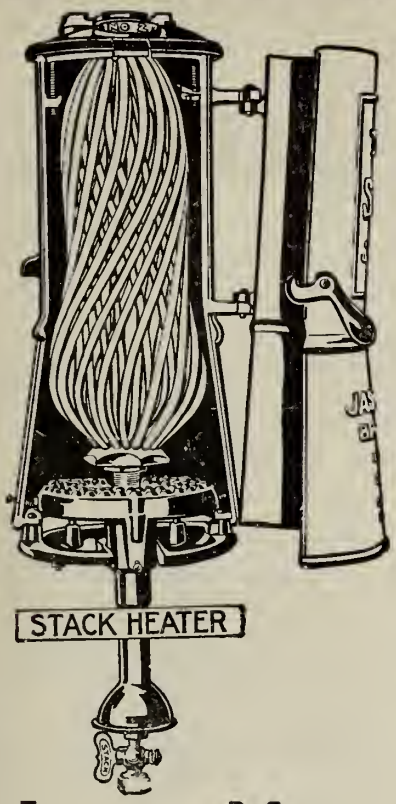
WANTED—A PRACTICAL PLUMBING AND heating salesman to travel in Alberta. References required. Write, giving age and experience. Address Box 800, Sanitary Engineer.

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The woman asked the negro his name when he applied for a job. "Mah name is Poe, ma'am."

"Poe? Perhaps some of your family worked for Edgar Allen Poe."

The negroe's eyes opened in surprise. "Why," he gasped, "why, ah am Edgar Allen Poe."



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From Recent Tests Made by Various Gas Light Companies

The STACK will heat 5 gallons of water 3 minutes quicker than the average heater.

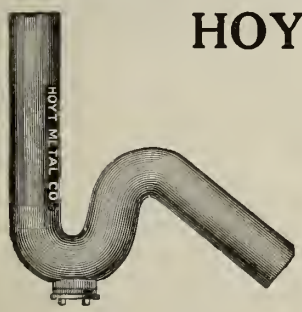
The STACK raises the temperature of 5 gallons of water 28 degrees higher in 10 minutes than the average heater.

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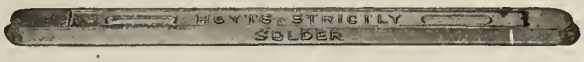
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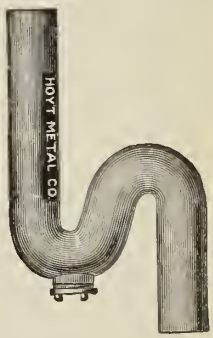
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MacLean's Magazine

for JANUARY

Chasing the Submarine---by a Canadian

A CANADIAN, whose name is withheld, in the Motor Boat Patrol Service in the North Sea, tells in the January MACLEAN'S the story of the work and life and triumphs of the Service to which he is attached. It is a fine performance by MACLEAN'S to get this story for the Canadian people. Successes of this sort have made MACLEAN'S go far forward in public favor during past months.

If the horrid and terrible submarine warfare and the conquest of this pest of the deep interest you, learn more about submarines and their capturing in the January MACLEAN'S, and pass on to others the news of this unsigned contribution.

Ships---more ships---and yet more ships

THIS is a very strong article which Miss Agnes C. Laut contributes. As usual she is very well informed. Regarding the duration of the war she voices American opinion when she says that it is likely to be long drawn-out. The United States people are buckling down to a stern struggle. At this time we want very much to read what well-informed, virile thinkers and writers have to say about the war, since things are not any too bright in certain directions. Miss Laut has a good deal to say about the shipping programme of the United States, and certainly she gives facts and sets us thinking as few writers do.

"Jim" by Robert W. Service

A POEM by this strong poet—a poem wrought amid the smoke and hell of battle, yet fanciful and tender One wonders how men can write fanciful verse amid surroundings that seem so adverse to thinking and writing, yet some gifted can detach themselves and let fancy play; or is it that their minds see through the real and horrible—through the immediate environment into inner things? Whatever it may be, we ought to be glad for the verse that men like Service give us, remembering how and where it is produced.

Adam and Arthur William Brown, Brothers

ADAM BROWN is a Canadian short story writer of large promise. His brother, Arthur William, is one of New York's foremost illustrators. Both brothers have joined their gifts to make Hannibal Helps a mighty good feature of the January MACLEAN'S.

A New Serial by Alan Sullivan

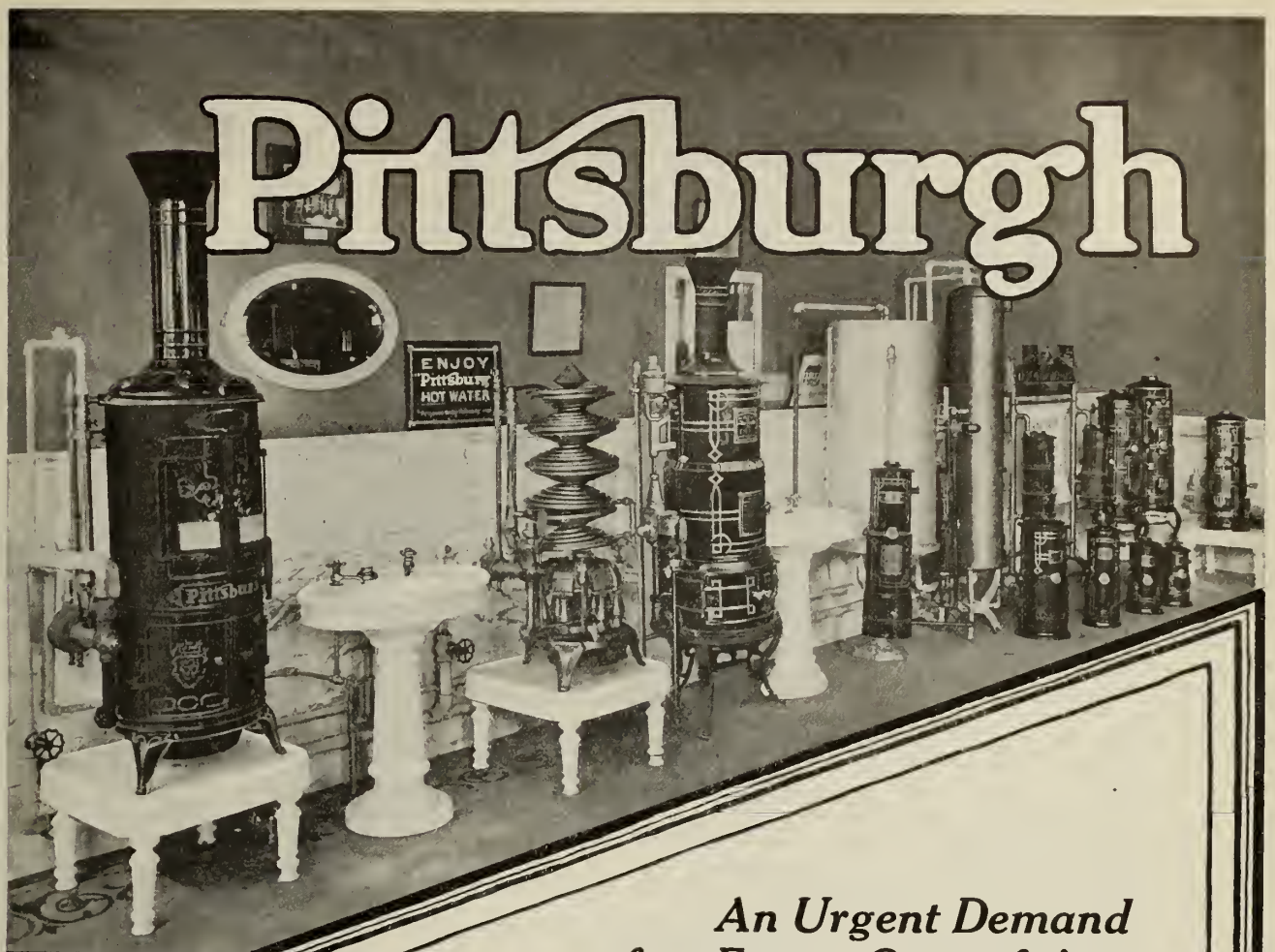
ALAN SULLIVAN'S recent novel, The Inner Door, is being well received. Perhaps we have no better novelist of his type in Canada to-day. He writes books that show introspection and fine analysis. This serial, The Magic Makers, adds venture and mystery to psychological study, and is a rare good thing. Arthur Hemming illustrates the story, which begins in Scotland and is transferred to Canada where the stage is set.

The Regular Departments of MacLean's

REVIEW of Reviews, Women at Work, The Business Outlook—are present in goodly measure. Oppenheim's The Pawns Count, Trench Pictures, and first-class illustrations by artists of note help to make the January MACLEAN'S good value for money.

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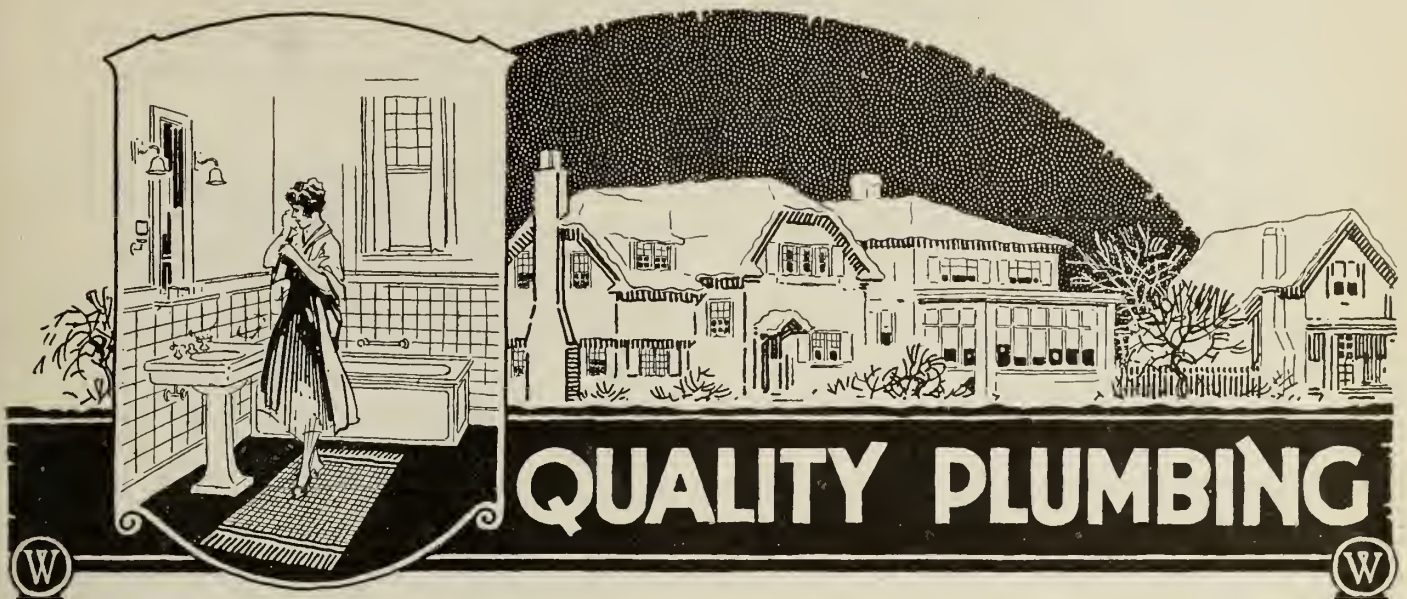
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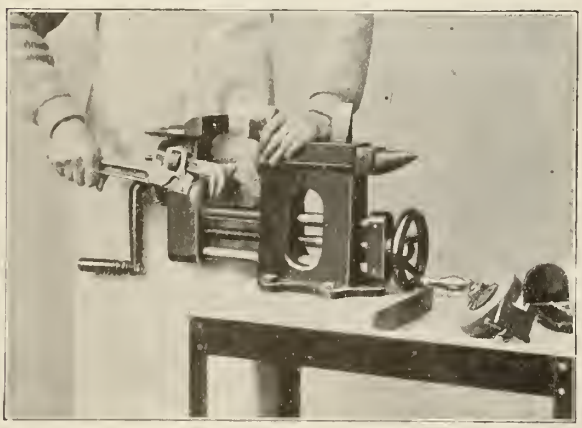
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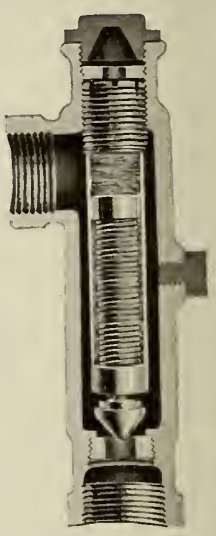
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It's not a toy. It's a real combination of practical tools for practical people.

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Trap Every Steam Line
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Radiators Too



The Steam Trap "SARCO" is not like other steam traps, it relies on the expansion of a heavy hydrocarbon oil operating a Sarco spirally corrugated Tube within a renewable cartridge. When steam reaches the cartridge, the trap closes and no steam escapes. When condensation collects the trap opens and discharges it.

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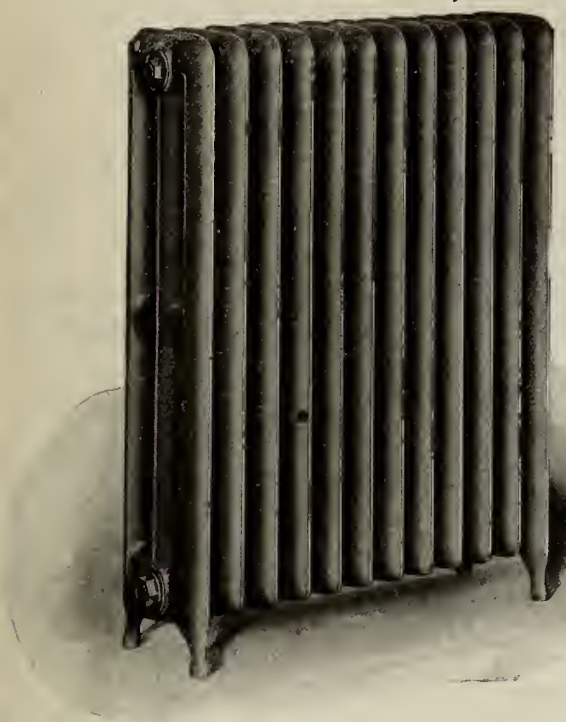
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Imperial Radiation Gives 100 Per Cent. Efficient Distribution

Getting the heat distributed

Imperial Radiation represents the most advanced ideas in heat distribution.



It allows free circulation and the rapid movement of heat from the boiler to the point of distribution—the radiator. Imperial Radiators, being smooth inside and offering no obstruction, are always well supplied with **hot** water. Heat-waste between boiler and radiator is reduced to a minimum—practically all heat being delivered to and given off through the radiator, where it is, of course, most effective.

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WE SPECIALIZE

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COMBINATION

Floor and Ceiling

PLATES



No. 10 Steel
3-8 in. to 4 in.

These plates have stood the best test—the test of time. They are carried by leading supplies, both in United States and Canada, and have been favored by them for years.

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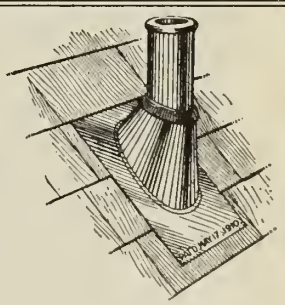
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The "Simplex" Roof Flashing



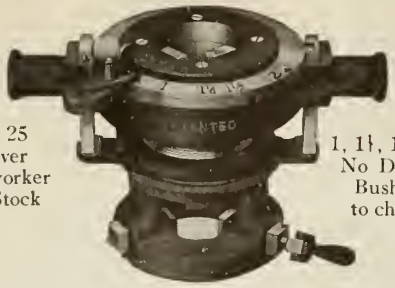
The shape of the sleeve makes it possible to fit any pitch roof from 50° to flat. Made of very best galvanized iron or copper with pure lead collar. This is the simplest and best adjustable roof flange on the market.

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1, 1¼, 1½, & 2 No Dies or Bushings to change

You Don't Pay for "Beavers"—

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Figure it out for yourself! Thousands of Beavers have been in constant use for nearly 10 years—and are still good.

The cost works out at about ½ cent a day for the tool shown in this advertisement.

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BLACK and GALVANIZED. SIZES, 1/8 IN. TO 4 IN.

All our pipe thoroughly inspected, tested to 600 lbs. hydraulic pressure and branded.

ALSO NIPPLES Black and Galvanized All Sizes

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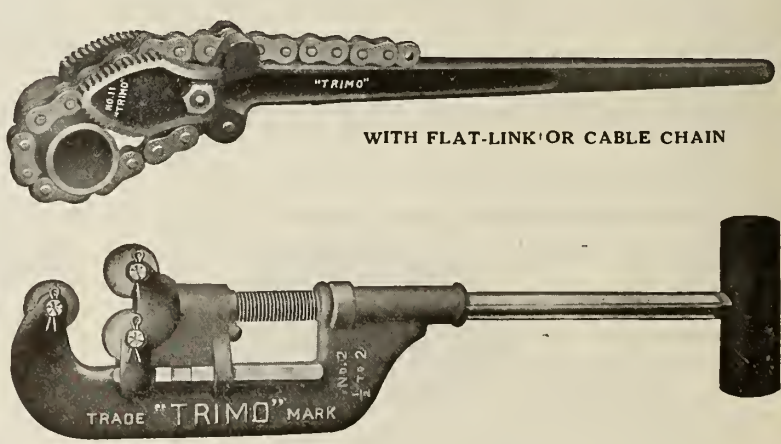
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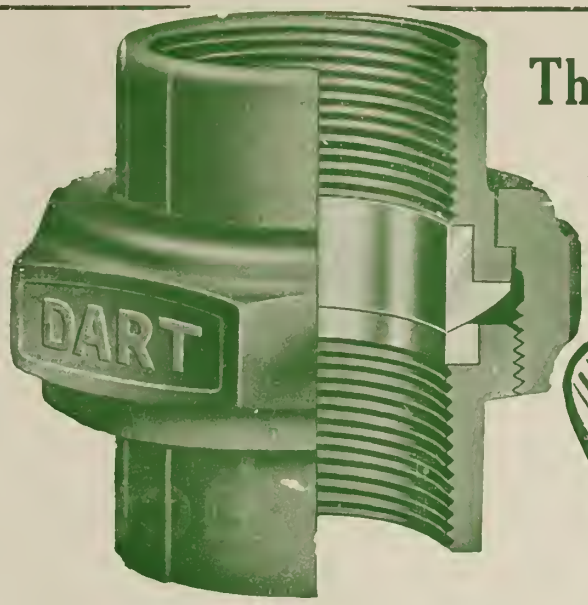
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This is the sure, safe coupling that makes every job permanently right.

Always specify Dart Unions for particular jobs. Remember that

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means permanence—nothing to deteriorate. No rust—no loosening—no leaks—always tight—always satisfactory.

Your jobber carries them in stock.

Manufactured by DART UNION CO., Limited, Toronto, Canada

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KERR IRON BODY GATE VALVES



Specify KERR'S (KEYSTONE) Iron Body Gate Valves on your next order, and let us prove what we claim for them.

Our Catalogue No. 5 tells all about them. It is yours for the asking. Write us to-day.

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Good Cheer, Friends!

LET'S MAKE the most of this Christmas.

TRUE, we can not forget that it's a war-time Christmas, nor can we forget that our bravest and best are still in the trenches. But we can borrow some of their cheerfulness, some of that spirit which jests at difficulties, and turns apparent defeat into glorious victory.

SO we'll wish you and yours a real old-fashioned Merry Christmas and hope that you'll enjoy every minute of it.

The Galt Brass Co., Limited

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